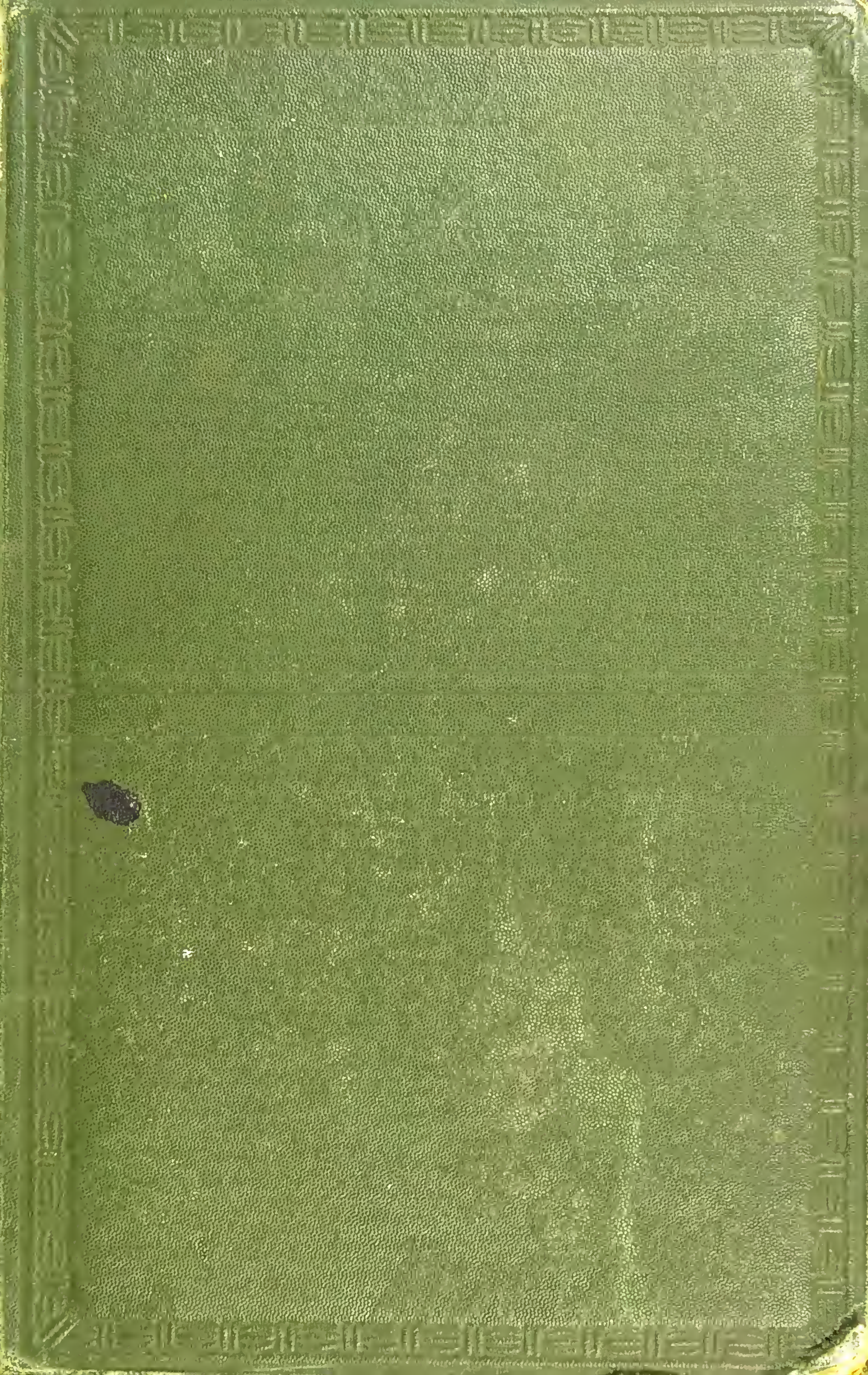

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ON

CANCER OF THE MOUTH, TONGUE, AND ALIMENTARY TRACT:

THEIR

PATHOLOGY, SYMPTOMS, DIAGNOSIS,

AND

TREATMENT.

BY

FREDERIC BOWREMAN JESSETT, F.R.C.S. Eng.,

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WITH NUMEROUS ILLUSTRATIONS.

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TO

SIR WILLIAM JENNER, BART., K.C.B., M.D., D.C.L., LL.D., F.R.S.,

PRESIDENT OF THE COLLEGE OF PHYSICIANS,

PHYSICIAN IN ORDINARY TO HER MOST GRACIOUS MAJESTY THE QUEEN,

THIS WORK IS DEDICATED

IN ADMIRATION OF HIS PROFOUND GENIUS,

HIS UNTIRING PERSEVERANCE AND DEVOTION TO THE ADVANCEMENT OF SCIENCE;

AND IN ACKNOWLEDGMENT OF NUMEROUS ACTS OF KINDNESS,

BY

THE AUTHOR.

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INTRODUCTION.

THE part of the following pages devoted to cancer of the alimentary canal, formed the subject of some lectures, which I lately delivered at the Cancer Hospital, Brompton.

I have chosen the subject of cancer and malignant growths occurring in the mouth, tongue, and alimentary canal for the subject of the present work, as I know of no separate work or monograph which treats specially on this very important subject.

It is true cancer of the alimentary canal in segments has been described in several works on medicine and surgery; and malignant diseases of some parts, have been dealt with in monographs of particular regions of the body.

The recent important innovations of treatment, more particularly introduced by some of the German surgeons, of cancer of the alimentary tract has led me to think that this particular region is worthy of special attention; and, instead of the different regions being dealt with in a fragmentary manner, as they now are, I have deemed it worthy that all the most recent knowledge of the pathology and treatment of these parts should be collected together into one volume.

I have for this purpose searched the writings of the most recent authors (a list of whom I append) upon the subject, and compared them with my own experiences and practice at the Cancer Hospital; and I am sure that those who may honour me by reading the results of my labours, as contained in the following pages, will agree with me that, while our knowledge has of late years very much increased, both in diagnosis and treatment, yet there is very much to be learnt.

The Registrar-General has this year again drawn attention to the increased mortality from cancer, and this increase appears to be more in men than women. He goes on to explain this in a degree to the increased knowledge, and therefore the more correct diagnosis, of the disease, by which the deaths ascribed to definite causes are always increasing at the expense of the indefinite class ; this may be so, but, on the other hand, because our knowledge of tumours and malignant growths has increased so much of late years, surely this is a reason why we are enabled to distinguish with much greater accuracy benign tumours, which were formerly undoubtedly classed under the heading of cancer, from malignant growths, and to classify them under the respective headings allotted to them. The Registrar-General also draws attention to the greater increase in deaths in males than females, and attributes this to the much larger proportion of *internal or inaccessible cancerous affections* in males, so that any improvement in diagnosis in this respect, would add more to the male than the female figures.

It will be interesting here, I think, to inquire somewhat into the origin or cause of cancer attacking some people and not others.

No modern authority doubts that the development of malignant disease is frequently due to local irritation. This has been proved in abundance of instances, and was first drawn attention to by Mr. Barwell, in a paper read by him at the South London District of the Metropolitan Counties Branch of the British Medical Association on "Acute Traumatic Malignancy." Numerous instances have been reported since then, and indeed before, which fully confirm this point ; but in reality this proves nothing, as the same individual may have received numerous blows in different parts of his body, and indeed upon the same part, before he received the identical blow which was followed by the development of a malignant growth.

There must be, therefore, something in the diathesis of the individual receiving the blow, or there is some dyscrasia in his blood, that renders him peculiarly liable to the formation of malignancy in his system; and I, for my part, have not met with any argument that has shaken my belief in the value of what Billroth calls "*tumour-diathesis*." There is not a doubt that a large percentage of persons who are attacked with malignant disease have a history of cancer in their family somewhere. I do not mean to adduce from this, that because a person is descended from cancerous parents that *he or she* must of necessity have cancer too; but I am strongly of opinion, and statistics, I think, fully confirm that opinion, that such offspring are very much more liable to be the subjects of cancer than those that have no such family history. Mr. H. Cripps is a supporter of the parasitic origin of cancer, and thinks there is a strong analogy between this disease and pyæmia, and is of opinion that, as in cases of acute pyæmic necrosis, the primary subperiosteal abscess often teems with minute organisms, and yet there has been no lesion of the skin by which such bodies could have been admitted from the external air; thus he is driven to the conclusion that the poisonous organism must have been circulating in the blood, in which it was innocuous; but when the extravasation caused by the blow allowed it to become stationary, it multiplied, producing all its local effects. So he raises the question as to whether the explanation of traumatic malignancy might not lie in some organisms accidentally circulating in the blood becoming the cause of active disease by infecting the cells of a part when left stationary by effusion into the tissues.

This theory of Mr. Cripps requires confirmation, as at present no such organism has been found in cancer; but, at the same time, I think his arguments tend to support the theory of heredity, as, by adopting this, he would at once be furnished with, if not an organism, at any rate some dyscrasia existing in the blood which, under irritation, might develop cancer.

Freund has lately drawn attention to the presence of sugar in the blood of carcinomatous patients, while in sarcomatous patients the blood is free from sugar or glycogen, but invariably contains peptine. The following is the test he proposes, as reported in the "Therapeutic Gazette."

Freund, in the "Therapeutic Gazette" of the 5th May, 1885, gives the following reagent as an aid to the diagnosis of doubtful cases of cancer :—

He takes about one drachm of blood, dilutes it with water, and decants it. After some time, and after adding a few drops of a solution of chloride of iron and acetate of soda (to precipitate the albuminates), he warms the liquid, neutralizes it exactly in a solution of caustic potash, and filters. The addition of Fehling's solution in a small quantity produces, on the application of heat, a yellowish precipitate ; the presence of a reducing agent (sugar) is thus proven. If this reaction does not take place immediately, glycogen is to be searched for by adding dilute muriatic acid, warming the mixture after a little while, neutralizing it again, and adding Fehling's solution, which process changes glycogen into sugar. Freund refers the reduction of Fehling's solution to the presence of sugar in the blood, which, in the urine, of course could not be found in an abnormal quantity. The blood of sarcomatous patients, subjected to the same chemical treatment, will, according to Freund, after precipitation of the albuminates, invariably show the presence of peptine (test with acetic acid and yellow prussiate of potash, or the biuret test), but will be found free from sugar or glycogen, while the blood of carcinomatous patients is positively free from peptine. The exclusion of diabetes in carcinoma and leukcæmia in sarcoma is, of course, a necessity.

I give the above as it appeared in the "Therapeutic Gazette," and if any of my readers feel disposed to carry out a course of experiments based upon the above theory, possibly some good results may follow. I have not had time to apply this test, and therefore pass it by without comment.

Dissemination of cancer is very much more frequent when the disease is situated in some parts of the body than in others. The form of malignant growth likewise greatly influences the predisposition to dissemination in different parts of the body. There can be no doubt that the dissemination of new growths through the intermediation of the veins and lymphatics is sufficiently established. There yet remain, however, many points to be cleared up.

Virchow was the first to establish the embolic dissemination of new growths by veins ; the way in which the embolus of new growths gets into the veins is usually by perforation of the venous wall. This has been observed in both small and large veins. Schüppel and Feltz have shown reason for believing that cancer cells may penetrate directly into the capillary vessels either by perforation of the capillary wall, or, following Cohnheim and Maas, by the actual migration of the cancer cell. This last mode, as Nepveu argues, though difficult to prove or refute, is most probable. He puts forward another method in a work by Legros, published some years ago: the statement is made that the vascular epithelia in a case of cancer of the breast were much larger than normal. Since 1872 Nepveu has made many observations to the same effect. And, further, he has noticed prolification of the epithelia lining the small veins and capillaries in apparently healthy tissues, situated at some distance from the morbid focus. As to the frequency with which this occurs, Nepveu states that he has no certain data; Nepveu names this form of dissemination "Endophlebitis cancerosa." For the dissemination of new growths by the lymphatics we have several views. Virchow spoke of perforation of lympathics and consecutive embolism. Koester thought there existed primitive epithelioma of lympathic vessels. Cohnheim utilized the migratory faculty of young cancer cells. Ranvier believed in direct communication of lymphatic channels with the cancerous alveoli. Other authors have dwelt on the action of a cancerous lymphangitis secondary to the primary disease. It seems not improbable, I think, that each and all of these theories may play a part in different cases.

16, *Upper Wimpole Street, W.*

CANCER OF THE MOUTH, TONGUE, AND ALIMENTARY TRACT.

CHAPTER I.

CANCER OF THE LIPS.

The form of cancer that is invariably found in the lips is *squamous-celled epithelioma.*

The lips are more frequently attacked with the disease than any other part of the body, excepting the uterus and tongue; thus, out of 860 cases of epithelial cancer occurring at the Cancer Hospital, the lips were the seat of the disease in 160 cases, or at the rate of 18·6 per cent., the tongue in 190 cases, and the uterus in 222.

The following Table will show in what proportion the disease attacks different parts of the body:—

Lips	160
Tongue	190
Mouth	17
Face	97
Trachea and larynx	4
Uterus	222
Labia and vagina	52
Rectum	26
Penis and scrotum	23
Ear	2
Other parts of the body	67
Total	860

Cancer in the lips is often the result of cracks or fissures, and in such cases the importance of an early diagnosis cannot be over-estimated, as it is only by recognizing this terrible disease in its early stage that a satisfactory result can be insured by treatment.

The lower lip is attacked very much more frequently than the upper; thus, out of the 160 cases which I have collected, in 140 the disease was situated in the lower lip, in 5 the upper, and in 15 cases both lips were the seat of the disease; so that in only 1 in every 28 cases, or 3·57 per cent., was the upper lip affected by itself, and 1 in 7 cases, or 10·7 per cent., was it affected at all, and the majority of these were from the extension of the disease from the lower lip at the angle of the mouth.

Sex plays a very important part, as out of the 160 cases referred to only 3 occurred in women.

Origin.—Although cancer of the lip often commences as a crack or fissure, it far more frequently has its origin as a warty growth or tubercle, which gradually ulcerates like the ordinary form of tubercular lupus. In neither case, however, is the suspicion of the patient or his friends aroused to the importance of these ulcerating spots, and it is only when the ulceration extends, and shows no signs of healing, or the warty growths increase in size so as to cause some inconvenience, that medical advice is sought.

Age.—This form of cancer, like scirrhus, is essentially a disease which attacks persons who have passed middle life; thus, out of 860 cases above referred to, 249 were above 60 years of age, 253 between 50 and 60, and 223 between 40 and 50 years of age, 725 being thus over 40 years.

By comparing my figures with those collected by Sir James Paget, it will be seen how closely his experience coincides with my own.

	20-30.	30-40.	40-50.	50-60.	Over 60.	Total.
Sir J. Paget	9	22	40	32	40	143
The Author	31	104	223	253	249	860

The average age at which persons are most liable to be attacked by epithelioma, as shown by the above Table, is therefore 51·9 years.

It is most essential, then, to bear in mind this important fact, that age plays a no insignificant part in aiding us to come to a correct diagnosis of a suspicious-looking ulcer on the lip, in which we may have grave doubts as to its true character. At any rate, we may deduce from the above Tables, and likewise from Tables drawn up by Mr. Morrant Baker in the Med. Chir. Transactions, that the conditions favourable to the production of epithelial cancers regularly increase with the increase of age, especially of the lips and integuments of the face.

Hereditary Predisposition.—Among the 860 cases collected by me there was distinct family history of cancer in 24, or at the rate of only 2·8 per cent. of the whole number. In many of these cases, however, there was no mention of any family history at all, and probably the question had not been thoroughly inquired into, and therefore the statistics in this respect are not satisfactory. Since I have been making special inquiries into this point, I have met with a great many cases in which there has been a distinct history of cancer in some member of the family of the patient. A most interesting and instructive case came under my notice at the latter end of last year. It was the case of a man aged 61 years, who presented himself with a large ulcerated epithelial cancer occupying the right half of his lower lip, extending along the mucous membrane of the cheek and gums of the same side. The glands of the neck and submaxilla were extensively diseased. His case was too far advanced to allow of any operative measures being had recourse to, and he died about three months after I first saw him, the disease having rapidly extended and eaten away the whole of his cheek and fauces. His family history was as follows: His father had cancer of the penis, which was amputated, and he died of secondary deposits in his liver at the age of 63 years. His uncle (father's brother) had cancer of the tongue, which was removed, and he died of secondary growths at the age of 63. The aunt (father's sister) had cancer of the breast, which was amputated, and she died of secondary growths at the age of 65. His mother died of cancer of the uterus.

In this case, from the situation of the cancer from which his father and uncle died, there can be no doubt that they both suffered from epithelial cancer, while the probability is that his aunt suffered from scirrhus. The importance of this cannot be overlooked, as I think it tends to prove that a person may suffer from one form of cancer, while his relatives may have suffered from another form ; thus, Sir James Paget states that, out of 160 instances, the following cases were found: (1) a man had medullary cancer of his toe; his father had cancer of the lip ; (2) a woman had repeated epithelial cancer of the labia; her sister, her father's sister, and her mother's brother's daughter had cancer of the breast; (3) a man had epithelial cancer of the lip, whose grandmother had cancer of the breast; (4) a gentleman had epithelial cancer of the interior of the cheek; his aunt died with cancer of the breast; (5) a woman had medullary cancer of the breast ; her mother had cancer of the uterus, and her uncle cancer of the face; (6) a woman had scirrhous cancer of the lip, whose mother's uncle had cancer of the lip; (7) of another woman who had a similar cancer, one cousin had cancer of the lip, another cousin had cancer of the uterus ; (8) a third woman had scirrhous cancer of the breast, whose grandfather had cancer of the lip ; (9) Dr. Warren mentions a case where the grandfather died of cancer of the lip ; his son and two daughters died with cancer of the breast; one of his grandsons and one granddaughter had also cancer of the breast.

A case recently communicated to me by my friend Dr. Dabbs, of Shanklin, also illustrates this. He writes: "A widower, clergyman, residing with his own two maiden sisters (retired from all work on a competency), suddenly lost all that competency and his sisters' capital also. Within a year and two months all these were dead, the clergyman of a malignant nasal growth, one sister of cancer of the breast, and the other of cancer of the stomach."

Such cases as these could be easily multiplied if necessary; but I think sufficient has been recorded to show, notwithstanding the small percentage of cases in which a family history could be traced, that heredity must have some influence in the development of cancer. As Sir James Paget points out, these facts may justly be regarded as evidence for the close affinity between epithelial and other cancers, and as an illustration of the modification which the cancerous and other functions may undergo in their hereditary transmission. I think it may even go further, and demonstrate that, although children of persons suffering from epithelial or other cancer need not themselves contract cancer, yet there is a certain dyscrasia of the blood transmitted from parent to offspring which is very likely to develop itself in one way or the other as cancer upon some very slight provocation; in fact, that such an offspring is more likely to develop cancer than a person with healthy parents.

Injuries.—A very large majority of men suffering from epithelial cancer of the lip are great smokers, and many will give a distinct history of some injury to the lip being caused either by the jagged end of a pipe scratching it, or the hot end of the pipe burning it, the sore being often constantly irritated by the persistence of the use of the pipe. Again, often the disease commences as a small wart or pimple, which the patient is constantly rubbing or picking, so keeping up a constant source of irritation: such a state of things often goes on for months, and even years, without any notice being taken of it, until at last the ulcer or warty growth may rapidly increase in size, and the sufferer then, when too late, seeks advice.

The diagnosis of epithelial cancer of the lip is not such a simple matter as at first sight it may appear, and I recommend you in all cases to be extremely cautious how you give a decided opinion upon the character of a warty growth, sore, or tubercle with indurated base. Many cases have come under my notice that at first sight had all the appearance of a malignant growth, but which, after a close examination into the history of the case, proved to be a chancre, or a sore of syphilitic origin. The sore in both cases may have identically similar appearances, the lip thickened, the base of the sore hardened and indurated, and yet the one will speedily disappear by appropriate treatment, while, in the other, treatment has no effect whatever upon the ulcer.* In both cases the submaxillary glands may be enlarged and painful. The chancre, however, upon inquiry, will be found to be only of a few weeks' growth, before which, the patient will tell you, his lips were perfectly free from any ulceration or induration; the glands in the submaxillary region become affected at a much earlier date than in cancer.

The age of the patient would also considerably aid in the diagnosis, as cancer, as I have already shown, is essentially a disease of advanced or advancing life, and is exceedingly rarely met with before the age of 30, and very much more commonly after 50 or 60 years; whereas chancres are most commonly met with in persons under the age of 30 or 40, and is found as often in one lip as the other, while cancer almost universally attacks the lower lip only. After from four to six weeks, should the sore be syphilitic, and have been allowed to extend without appropriate treatment, secondary symptoms will succeed, which of course at once decides its nature, and then, by large doses of iodide of potassium, or a mild mercurial treatment, the ulcer will speedily heal.

---

* In a case that came under my notice only the other day, a man had a large ulcerated mass, implicating nearly the whole of the lower lip, the base was hard and indurated, the edges everted, and it was diagnosed to be epithelial cancer of the lip, so far advanced as to be almost beyond surgical interference; the man, however, was admitted into the hospital, and treated with large doses of iodide of potassium, with the result that the ulcer speedily healed, and the induration disappeared.

An epithelial ulcer of the lip, when once it has ulcerated, never heals; it scabs over, and, on removing the scab or crust, the sore will be seen gradually increasing in size. The edges are jagged, and somewhat everted; this, as the disease progresses, is very much more marked. The base of the sore is hard, and the tissues around indurated. The glands are affected comparatively early. Whether, in all cases where the glands are enlarged, they are infiltrated with the disease is, I think, open to doubt; yet the chances are such that it is never wise to leave an enlarged gland behind, as it may at any moment take up fresh and active action. A case of a man aged 63, who was under my care not very long ago, had an epithelial growth on his lower lip circumscribed and slightly ulcerated. He had one gland enlarged the size of a nut in the submaxillary region. I removed the growth, and he made a good and speedy recovery. I left the gland, thinking it might be enlarged merely by sympathetic irritation. After the operation the gland decreased in size, but remained about the size of a small French bean. I kept this man under observation for some weeks after his discharge from the hospital, and the gland not increasing in size, he was told to report himself from time to time. He did not turn up for nearly two months, and when he did he had caught cold, he said, and the gland was much more enlarged. I examined him, and found not only that the gland had very much increased in size, but that some of the cervical glands had also become implicated; the disease rapidly increased, and he died a few months later.

From this case one learns how insidious the disease is, and how necessary it is in all cases to remove any glands that may be in the least enlarged at the time of the operation.

The diagnosis of cancer from ordinary cracks and fissures is easy, as the latter almost invariably attack young and delicate people, while cancer is a disease essentially of advancing years.

Cracks and fissures in the lips are usually met with in children and young persons, in the middle or near to the centre of the lower lip; they do not as a rule extend deeper than the mucous membrane, and are generally accounted for by some gastric derangement coupled with cold. These fissures are often excessively painful, and bleed freely if their edges are separated.

They usually yield to appropriate treatment, such as the application of nitrate of silver locally, and the internal administration of an alterative, followed by cod-liver oil and steel in debilitated strumous children, or some little stomachic and tonic in others.

While these cracks and fissures are of very little importance in early life, after the period of childhood, or in adults, they must be regarded with extreme caution and suspicion, as they are often the result of syphilitic or tuberculous poisons, and, moreover, may, if neglected, be the precursor of cancer or epithelioma of the lip. If due to syphilitic taint, the history of the case will in most cases enable the surgeon to arrive at a correct diagnosis. When an anti-syphilitic treatment, viz., large doses of iodide of potassium, are given, the ulcers heal.

Cancer of the lip is always of the squamous-epithelial type; I have never met with a case of scirrhus, neither is any such recorded in the case-books of the Cancer Hospital.

Dissemination.—Secondary deposits are never, or at any rate excessively rarely, met with in other organs or parts of the body in this disease.

Treatment.—The treatment of cancer of the lip must be based upon the best method of destroying or removing the disease: this can be done in some cases by caustics, such as chloride of zinc or arsenical paste, but in most cases recourse must be had to removal of the disease by the knife. I have no hesitation in saying that, in my opinion, the use of caustics is never, or very rarely, to be recommended. They are far more painful than the knife, not nearly so certain in their action, and may, and probably would, be required to be applied again and again. I would therefore in no case, excepting the patient absolutely declined the use of the knife, recommend the application of caustics for the removal of this disease.

One often sees patients who present themselves with epithelial sores on their lips, on which they have, either of their own accord or by the advice of the medical man they have consulted, applied blue-stone or nitrate of silver; this form of treatment cannot be too severely condemned, as it increases the irritation, is very painful, and often causes a rapid increase in the size of the ulcer, to say nothing of the wasting of most valuable time.

If caustics are to be used, therefore, no half-measures must be adopted. There are various kinds of caustics in use; that most in favour at the Cancer Hospital is the arsenical paste made thus:—

℞ Acid arsenious.
Pulv. acaciæ, āā.
Aquæ, q. s. ut ft. mucilage.

This paste is painted tolerably thickly over the sore, and a small piece of lint applied, extending to about a line beyond the ulcer, and allowed to dry on. The caustic quickly attacks the diseased tissues, and sets up considerable inflammation; a bread-and-water poultice is then applied, and a deep slough speedily becomes detached. If the raw surface is not considered to be healthy, another application of the paste is recommended.

The Vienna paste is a great favourite with many; it is the "potassa cum calce" of the Pharmacopœia. It should be applied to the ulcer for from ten to twenty minutes, and followed by a poultice. Landolf's caustic is as follows:—

Bromin. chlorid.	3 parts.
Zinci	2 parts.
Antimon.	1 part.
Pul. rad. glycyrrh.	1 part.

Fell's caustic, another which at one time promised to have a considerable reputation, and which now is in use by a few empirics, is composed thus:—

℞ Pulv. rad. sanguinariæ Canaden.	℥ss vel ℥j.
Zinci chlorid.	ʒij „ ℥ss.
Aquæ	℥ij.

A thick paste is formed.

Dr. Mackey, of Edinburgh, has used a caustic composed of—

Hydrarg. bichlor.	℥iv.
Glycerine	ʒxxx.

Ft. mucilage.

This makes a paste, which is allowed to remain in contact with the part for four hours; to be followed by warm water dressing. The slough separates in from three to six days.

Early and free excision should always, where practicable, be adopted, even if the submaxillary glands should be affected; in this case, however, it would be advisable to remove any glands that were found to be enlarged.

Should, however, it be found impossible to remove the whole of the disease by operation, the surgeon is not justified in attempting any such mode of treatment.

Numberless cases, unfortunately, present themselves which are entirely beyond our skill to remove. Something, however, may be done for these to mitigate suffering. The patient's strength must be maintained as far as possible by good, nourishing diet. Medicines can do little or nothing excepting there be much pain, when opium or morphia should be administered freely. Of local treatment, strict cleanliness, constantly irrigating the ulcerated parts with weak antiseptic solutions, and afterwards dusting them over with iodoform, tends much to the patient's comfort. A good lotion is formed by mixing the glycerine of carbolic acid with sulphite of soda and water, and either painting over the part with a camel's-hair brush or using an atomiser.

℞	Glycerine acid. carbol.	℥ss.
	Glycerine	℥ss.
	Sodæ sulphitis	℥j.
	Aquæ rosæ	℥x fl.

This solution, in some hands, is extolled as not only affording much relief from pain, but also it is said to possess a marked influence in retarding the progress of the disease. It has also been administered internally in teaspoonful doses.

The tinct. hydrastes Canadensis, of the strength of 1 drachm to 8 ounces of water, has been recommended by Dr. Edwin Payne as having a power of keeping the surface of the ulcer in a more healthy, and less offensive, condition.

Chloride of zinc in solution is a very favourite preparation with many. It certainly has a great power of arresting phagedenic action. Great caution is required in the use of this salt, as it is a powerful cauterant, a stimulant, an antiseptic, and an alterative. Dr. Zuerine, of Vienna, relates a case of cancerous ulceration of the septum nasi which threatened to destroy the whole nose; 1½ grain of the chloride of zinc, he says, were dissolved in an ounce of distilled water; the scab being removed, the sore was pencilled over several times a-day with the solution. At the end of a fortnight a healthy granulating surface was formed underneath the thick crust which covered the sore, and this being occasionally removed, and the solution reapplied, it cicatrized in five weeks.

A paste of one part of chloride of zinc with three of flour, moistened with water, has been used in extensive cancerous diseases, and the salt given internally with apparent benefit; but I have not seen any good results accrue from this treatment; neither do I think, if the patient be so bad as to negative operative measures, are we justified in using these powerful caustics to endeavour to remove the disease.

It is not uncommon for erysipelas to supervene in some of these cases of epithelioma of the lip. The best treatment is to paint the whole surface over with tincture of iodine, tincture of perchloride of iron, or the following solution of perchloride of iron and quinine:—

℞	Tinct. ferri perchlorid.	℥j.
	Quinæ disulph.	ʒj.
	Tinct. cinch.	ʒij to ℥ss.

To be brushed over the part every hour.

Internally the tinct. ferri perchlor. and quin. should be administered freely.

Pathological Specimen.—In University College Hospital Museum are two specimens, Nos. 1007 and 1008, where the disease has extended from the lip to the symphysis and body of the lower jaw, together with the soft parts of chin, in which Mr. Christopher Heath removed the whole of the diseased parts; but, as will be seen by the description and report of the cases, not with very happy results.

> "1007. Part of a lower jaw, including the symphysis and the body on either side for about an inch, together with the soft parts forming the chin and middle of the lower lip, the whole being removed for epitheliomatous disease. The morbid growth has invaded the entire thickness of the soft parts, and is intimately adherent to the bone; its upper part is deeply ulcerated, the edges of the ulcerated portion being sinuous and slightly raised and rounded: in the situation marked by the piece of coloured glass, the substance of the lip has been completely perforated.
>
> "From a man, æt. 58, admitted under Mr. Heath's care, May 17, 1876. About eighteen months previously the patient noticed a small crack on the inner side of the lower lip, which, after increasing, healed up, a firm

swelling having, however, by this time formed in its situation. In July 1875 the patient went into the Maidstone Infirmary, where the diseased parts were removed ; in three weeks the wound was healed, and he left. About December a fissure reappeared in the same spot, after exposure to cold, a morbid growth subsequently appearing on either side of the fissure, which then commenced to enlarge, and the growths at the same time increasing.

"The patient was in the habit of smoking a clay pipe, holding it to the left corner of the mouth, where he first noticed the fissure.

"No history of any similar disease in the family.

"The parts shown were removed in the following manner :—A vertical incision was made on each side of the growth from the lower lip to the point of the chin, the lower ends of these incisions being united by a transverse one. The upper half of the jaw, and with it the lip and morbid growth, were then removed with a small saw. The section not having been made beyond the whole of the disease, the skin was dissected from the bone and tumour remaining to the lowest point of the chin, and the middle portion of the lower jaw sawn vertically through on each side; the digastric, genio-hyoid, and genio-hyo-glossus muscles were divided with scissors, and the remaining portion of the disease removed. The parts were brought together by means of hare-lip pins, and the tongue securely drawn forward. The patient was attacked with bronchitis, and, in addition, the wound was affected, on the tenth day after the operation, with erysipelas, and the patient died on the following day."

"1008. The soft parts forming the chin, together with the lower part of the body of the jaw, for about its middle three inches, the whole being removed for recurrent epitheliomatous disease. The morbid growth forms a prominent oval mass measuring about four inches from side to side, and closely surrounding the lower border of the jaw ; on the left side a portion of the bone has been replaced by nodules of tumour-substance ; the tumour projects posteriorly, so as to fill the concavity of the jaw for a distance of nearly two inches. The skin is almost everywhere intimately united to the substance of the tumour, and is in places raised in round and oval swellings by extensions of the growth ; in these situations the integuments are smooth, thinned, and apparently infiltrated. In two or three places ulceration has spread very deeply into the main substance of the morbid growth, which is extensively hollowed, and beyond this into the parts beneath the floor of the mouth. The tumour is composed of an opaque, firmish, homogeneous substance, intersected by scanty lines of bright fibrous tissue.

"From a man, æt. 55, a fisherman ; admitted under Mr. Heath's care, November 1875. Four years before admission the patient noticed that 'the skin came off' the left corner of the lower lip, causing some pain; the sore healed, reappeared, and again healed, this happening several times. The ulcer subsequently reappearing, extended, and on each of its sides a swelling grew, which, after a time, ulcerated as the original surface.

"In February 1872, about twelve months after the first appearance of the disease, the patient went into the Monmouth Hospital, where the growth was removed by a V-shaped incision, the wound healing in a week.

"About twelve months before admission into University College Hospital, a small swelling appeared under the front of the lower jaw on the left side, at first not painful, but becoming so in its growth. About four months before admission the morbid growth commenced to ulcerate, the ulceration appearing in several spots at the same time.

"The diseased mass was removed by making an incision round it to the bone, which was then sawn through in the same plane. The mouth was not opened, nor the alveolar border of the jaw injured. The extensive surface resulting was left to heal by granulation. Cicatrization was not complete when the patient left the hospital, December 23, 1875. The disease returned soon afterwards, and ended fatally in a few months."

Operations.—It having been decided to remove the growth by means of the knife, the patient should be put under the influence of an anæsthetic, and placed in the recumbent position. Any broken or carious teeth that may tend to irritate the lip should be removed, as well as any collection of tartar that may be present.

Some operators, for small operations, prefer having the patient seated in a high-backed armed chair, and tied securely in, but I can see no advantage in this, and infinitely prefer having my patient on the table.

The lip on either side of the disease should be firmly compressed between the thumb and forefinger of an assistant; the surgeon then, seizing the ulcer with a pair of artery forceps, and putting the lip on the stretch, makes a free incision at least an eighth of an inch from the ulcer on one side, continuing downwards and inclined towards the centre of the ulcer, so as to finish the incision about half-an-inch below and opposite its centre; he then, putting the lip on the stretch in the opposite direction, makes a similar incision extending to the end of the first, and thus removing the ulcer in a V-shaped piece. The cut edges should then be brought together by means of two or three hare-lip pins and thick silk twisted over them in the ordinary way. There is no occasion to tie any vessels as a rule, as the pressure of the pins is sufficient to arrest all hæmorrhage. Great care should be taken to insure the careful adjustment of the margin of the prælabium. A fine catgut suture through the mucous membrane here is often of advantage. Some surgeons prefer bringing the edges together with interrupted wire sutures.

It is always a good plan to oil the pins and silk with carbolic oil before introducing them, as it prevents the silk from sticking quite so firmly, and causes less pain when removing the pins. A narrow piece of lint, soaked in carbolic oil, should then be twisted round the pins, and a four-tail bandage, with a hole cut in the centre for the chin, applied.

Modifications of this operation are often requisite to meet the requirements of different cases, and much must be left to the ingenuity of the operator.

In cases where the disease extends very deeply, and possibly the whole or the greater part of the lower lip is affected, some form of plastic operation must be performed. In a case that came under my care a short time since the disease extended from the angle of the mouth, slightly implicating the upper lip to half-an-inch on the opposite side of the middle line; it also implicated fully three-quarters of an inch of depth of the lip. To remove this without at the same time performing some plastic operation would have been to leave the patient in nearly as bad a plight as I found him. He had also an enlarged gland under the maxilla. I cut a V piece of paper corresponding to the incisions I intended to make for the removal of the disease (Fig. I), and, fixing the apex of the triangle, twisted it round so that it should be exactly at right angles with the first. I marked

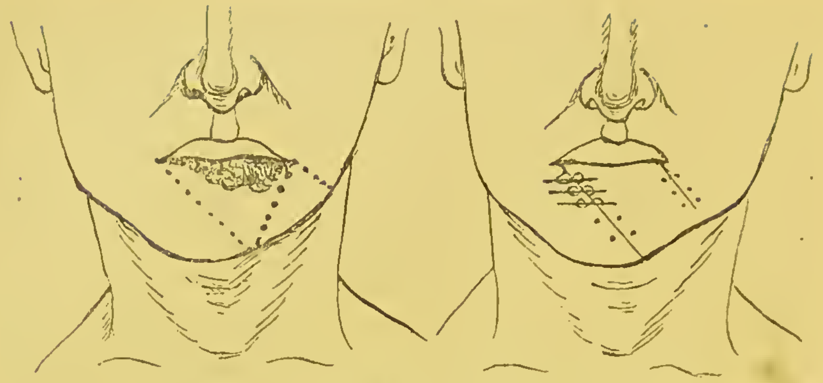

Fig. I.

this out with ink, and then proceeded to remove the growth. In this case, as there was pretty free hæmorrhage, I ligatured the coronary vessels, and then made my other incision, extending it well over the diseased gland, which I removed, and, dissecting up the flap, twisted it round so that it fitted accurately the cut surface of the lip, and fastened it there with stout silver-wire sutures; by loosening the integument under the jaw I was enabled easily to bring the loose flap up and unite it to the other cut surface.

This man made an excellent recovery, and had a very good mouth. He died six months after the operation from secondary deposit in the cervical lymphatic glands.

When the whole of the lower lip is affected, and it is thought desirable to remove the disease, the operation described

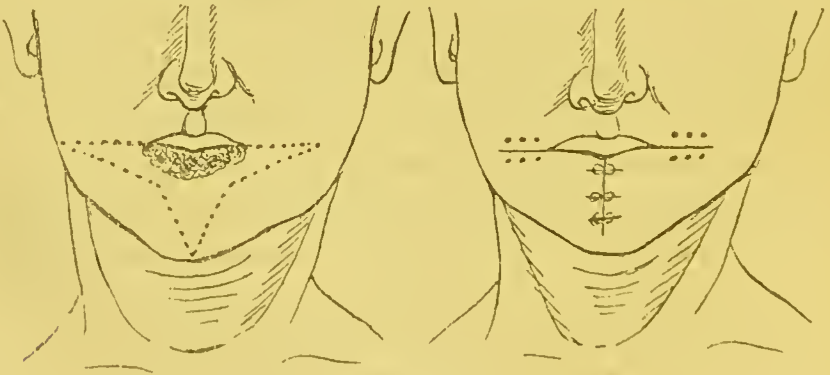

Fig. II.

by Mr. Erichsen is an excellent method, and yields good results. His plan (Fig. II) is a modification of that proposed by Serres. The object of the operation is to raise the lower lip to a level with the incisor teeth. An incision, about three-quarters of an inch in length, is made directly outwards from the angle of the mouth on each side, into the cheek; from the extremity of this a cut is carried obliquely downwards on to the upper margin of the lower lip, so as to excise the included triangular piece. The lower lip is then dissected away from the jaw from the inside of the mouth, and a V-shaped piece is taken out of its centre. By means of hare-lip pins on each side and a few points of suture, the incisions in the angle of the mouth are brought together accurately, and in the same way the vertical one in the centre is united. In this manner the whole of the lower lip is raised and brought more forward. Care should be taken in removing the cancer from the edge of the lip to leave the mucous membrane rather long (which may be always done, as the skin is affected to a greater extent than it); a good præ-labium is thus formed, and the restoration effected with but little deformity. Care must be taken to prevent union from occurring between the inside of the lower lip and the gum, by the interposition of a strip of oiled lint.

Buchanan, of Glasgow, as far back as 1841, published an account of a method for restoring the lower lip when affected by extensive cancerous disease, which leaves most satisfactory results.

The diseased part of the lip is first removed by a free sweep of the knife. An incision, B C, is then carried downwards and outwards on each side of the chin, and another incision, C D, upwards and outwards, parallel to and corresponding in length to A B. The flaps formed by these incisions are represented in Fig. III. They are detached from their subjacent connection, and the whole is raised upwards, so that the original elliptical incision curves into a horizontal line, and is made to constitute

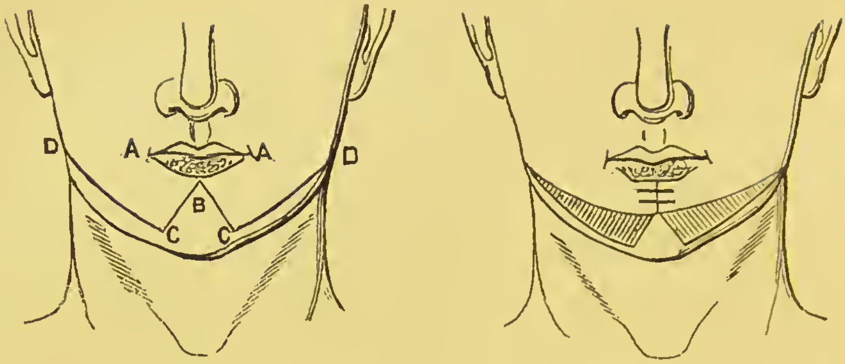

Fig. III.

the margin of a new lip, the secondary incisions under the jaw coming together in a vertical direction, in which they are retained by pins with twisted and interrupted sutures.

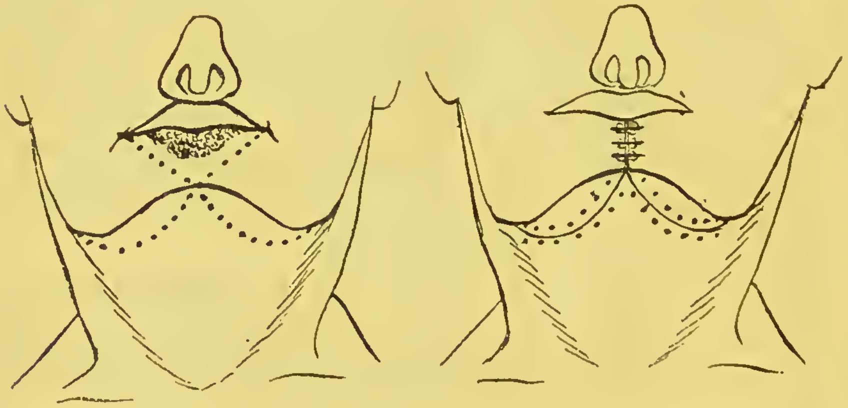

Fig. IV.

Professor Syme has practised, and recommends, the adoption of an operation somewhat different from any yet described (Fig. IV). He sweeps the whole of the diseased portion of the lip off with a semicircular incision extending from the angle of the mouth on the one side to that of the other; he then, from the centre of this incision, makes two other elliptical incisions extending downwards and backwards to the angle of the jaw on both sides. The flaps so formed are dissected freely up, and brought together in the middle line, the portion of skin which is left at the chin serving to keep the flaps in position and prevent them slipping down. This operation gives very excellent results. Two cases at the Cancer Hospital, under my care, have been operated upon by this method recently, and the results have been most satisfactory.

In all these plastic operations of the lip it is well to stitch the mucous membrane and skin of the free border of the new lip together; this heals very quickly, and saves the patient much pain and discomfort.

There are cases sometimes in which the ulcers are very superficial, and in which it is needless to remove a V piece of the lip, which of necessity must considerably decrease the calibre of the mouth. In these cases I content myself with slicing off the ulcer, being careful, however, to keep sufficiently far from it; I then stitch the mucous membrane carefully to the skin. A case came under my care only a short time since in which a considerable part of the lip, some inch in extent, was eroded, and evidently the seat of epithelioma. In this case I adopted the method mentioned above, with most happy results.

Sometimes, although very rarely, the upper lip is the seat of most extensive disease, which may necessitate removal of the whole of the diseased part. In these cases a really good lip may be secured from the cheeks. An incision is to be carried upwards and outwards on either side of the nose to midway between the alæ and orbit; another incision is then made from the end of the last, extending parallel to the orbit as far outwards as the malar bone; these flaps being dissected up and brought down, the edges of the first incisions are to be united in the middle line (Fig. V). Excellent results may be obtained by this operation.

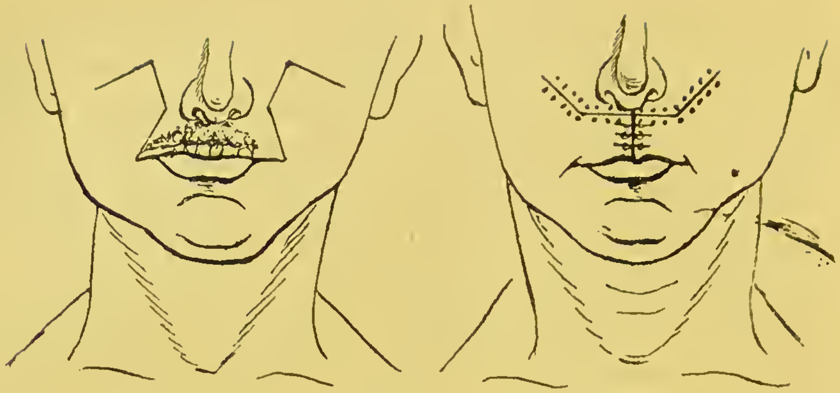

Fig. V.

Dieffenbach suggested, and practised, making two flaps, the inner incision extending from the angle of the mouth to midway between the alæ nasi and orbit on each side; then another incision extending from the extremity of, and at right angles to, this incision, outwards to the depth necessary for the lip. A third incision is carried from the extremity of this last downward and parallel to the first, as low as midway between a line drawn from the alæ nasi above and the angle of the mouth below. These flaps are dissected up and twisted over, and the ends united with hare-lip pins in the middle line, the edges of the remaining wound being brought together by means of silver-wire sutures (Fig. VI).

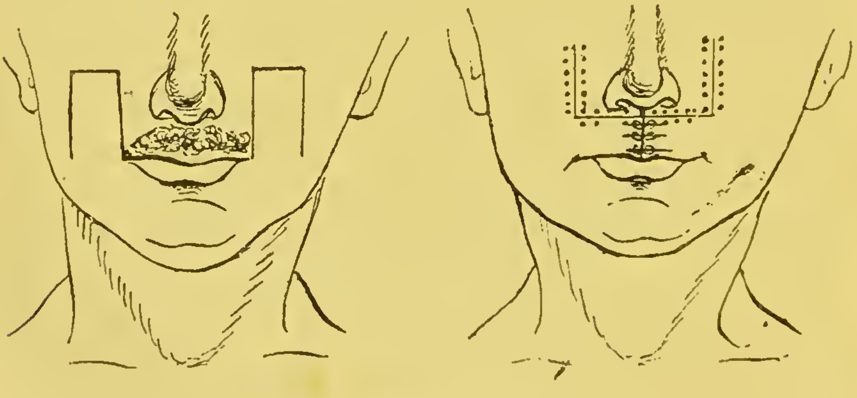

Fig. VI.

Leidillot has suggested another operation, by means of which the flaps are obtained from the cheeks below the margin of the mouth. He extends the incision at either angle of the mouth by which the upper lip has been removed downwards in a continuous line as far as the lower edge of inferior maxilla, then, continuing at right angles outwards, another incision the necessary distance to represent the depth required for the lip; a third incision parallel with the first is then taken upwards to a point slightly above the line of the mouth, the flaps dissected up and brought together in the middle line by hare-lip pins, the edges of the wound resulting from the removal of the flap being somewhat raised and similarly united (Fig. VII).

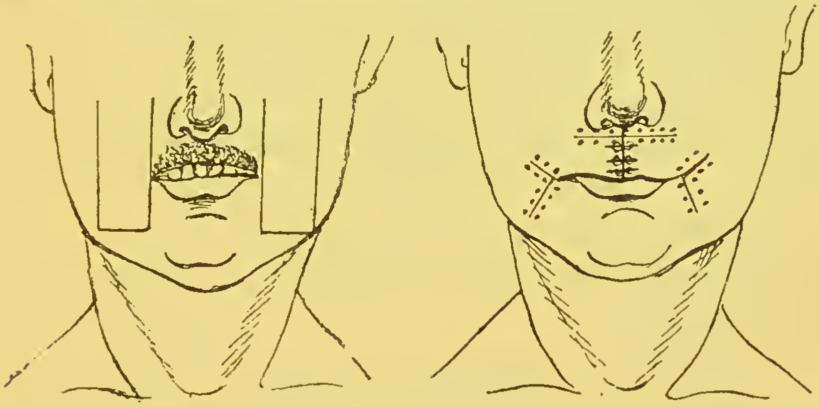

Fig. VII.

CHAPTER II.

CANCER OF THE GUMS AND ANTRUM.

EPITHELIOMA is the only form of cancer that affects the gums ; it may commence in three ways, viz. :—

1. Primarily, from the mucous membrane of the gums.

2. Secondarily, from continuity, *i.e.*, the epitheliomatous ulceration may extend, from an ulcer already existing, either on the tongue, floor of the mouth, or the mucous membrane of the lip or cheek.

3. The disease may commence in the bone, and extend, pushing itself outwards between the teeth, or in the place from which a tooth has been extracted.

In the first two instances, the disease is always of the squamous variety, whereas, in the third, it is usually of the columnar type.

The disease is of comparatively frequent occurrence, and is usually the result of local irritation, such as that caused by decayed teeth, old stumps, a badly-fitting plate that rubs or pinches the gums in some one place, collections of tartar around the teeth, the constant use of neat ardent spirits, burns or scalds ; all of these are common exciting causes of the disease.

In the Cancer Hospital, out of 841 cases of epithelioma, the gums were the seat of the disease in only 25 cases, or at the rate of 2·9 per cent. ; in nearly all of these the disease commenced in the gums or floor of the mouth, and extended to the jaw.

This disease must not be confounded with the epulides, and cannot be included among them, as there is very rarely any outgrowth or tumours in their early stage.

Primary epitheliomatous ulceration of the gums or mucous membrane of the mouth commences in a most insidious manner; first a small superficial ulcer or warty growth of the mucous membrane presents itself, which causes little or no pain or inconvenience, and therefore does not attract the attention of the patient sufficiently for him to seek advice; it sometimes grows slowly, at others very rapidly, extending into the floor of the mouth or the cheek; the base of the ulcerated surface becomes indurated, the edges jagged and everted, and the floor of the ulcer has a most eroded and unhealthy appearance.

The primary ulcer of the gum has a great tendency to extend to the alveolar process of the jaw, which speedily becomes softened and absorbed; as the disease extends the teeth are loosened in their sockets, and pushed up, either dropping out or are easily removed. The pain is most agonizing, extending over the back of the head and neck and supraorbital region. There is greatly increased salivation and putrid sanious discharge; and often in the case of the lower jaw spontaneous fracture takes place, as occurred in two cases under my care lately. (*Vide* Cases.)

Although the disease often attacks the jaws primarily, it far more frequently affects them secondarily, extending from an epitheliomatous ulcer of the tongue or lip; these secondary ulcers exhibit the same tendency to attack the jaws, and run the same course as the primary.

In those cases in which the disease is secondary to the disease commencing in the antrum or alveolar process, the patient in the first place notices a good deal of sharp neuralgic pain shooting from the diseased point along the course of the nerve or nerves, causing often most intense agony; as the disease progresses tumefaction of the gum takes place, either between the teeth or in a space where a tooth has been removed; the teeth in the immediate neighbourhood become loosened, and an unhealthy sanious discharge takes place between the gum and the teeth; presently the mucous membrane breaks down and ulcerates, and a large, deep, filthy, ulcerated surface presents.

In all the varieties the submaxillary glands become affected very early, and the tissues around infiltrated with the disease, which speedily break down, and abscesses are formed, which point in the neck or beneath the jaw. When cases have arrived at this state the patient rapidly succumbs, either from hæmorrhage, blood-poisoning, or exhaustion from inanition.

It is these tumefactions that push up between the teeth or alveolar process which are very likely to be confounded with epulis, and indeed it is most difficult to diagnose between them in the early stages. Thus, Mr. Christopher Heath, in his work on diseases of the jaws, mentions a specimen which was sent to him by "Mr. Hutchinson, who had removed it from the lower jaw of a lady aged 55, where it had been growing for a year; this specimen was examined by the late Mr. Bruce, with the following report: The surface of the tumour is covered with healthy mucous membrane. The interior is whiter, and firmer and more compact, than the surface, but there is no line of demarcation between the tumour and its mucous covering. The structure of the growth is distinctly glandular, very much resembling some forms of compact adenoma of the breast. At the point of attachment of this to the part beneath a remarkable transformation of the glandular into the epitheliomatous structure may be seen. In one part of the section may be seen the cut ends of glands tubules, whilst in their immediate neighbourhood are most distinct nests of true epithelioma, consisting of concentrically arranged cells compressed from the centre outward." Mr. Eve has also placed in the Museum of the College of Surgeons an epulis which microscopically had the character of an epithelioma, but contained no cell-nest.

Epithelioma of the Antrum is a very insidious disease, and also of rare occurrence. I have never met with a case. Christopher Heath says it was first described in the "Clinic" of M. Verneuil by M. Reclus (Progrès Médical, 1876), who termed it very aptly "épithélioma térébrant;" and Mr. Butlin drew attention to it in 1881.

M. Reclus suggests that the disease originates in one of the periosteal cysts of the fangs of the teeth; but Mr. Heath thinks it more probable that it starts from the socket of the tooth, and derives its squamous character from the palate. Epithelioma slowly destroys the mucous membrane of the antrum, attacking the bone, and spreading along the canal leading from the antrum in all directions.

It is most important that this disease should be recognized early, as it advances so insidiously, but at the same time so quickly, that without early surgical interference is had recourse to there is little hope of eradicating it; the attachment of any growth to the fangs of an extracted tooth should excite suspicion as to the presence of the disease.

In the case narrated by Mr. Heath, and that by Mr. Butlin, the disease had extended too far before operative proceedings were adopted, and then it was found it had extended beyond the reach of the surgeon.

Mr. Heath in his work describes two cases that were under his care, one of which at first was thought to be epithelioma of the palate, but in which the antrum was found extensively diseased; the other was a good typical example of the epithelioma.

"The patient, aged 66, had a troublesome and loose upper molar tooth, for which he consulted a well-known dental surgeon in the west of England, who extracted the tooth; the disease then speedily became apparent, bringing away a soft growth attached to the fangs.

"The opening was found to communicate with the antrum, and shortly a fungous growth protruded, and there was a good deal of discharge. The case was regarded as one of disease of the antrum, which was well syringed out, but the palate became more involved, and the cheek somewhat swollen. When Mr. Heath saw the patient in September 1881, a month after the extraction of the tooth, there could be no doubt of its serious nature. Under chloroform he was able to pass his finger through the fungus completely into the antrum, which was widely affected. Turning up the lip without incising it, he was able with saw and bone forceps to remove the floor of the antrum, which show the disease very well (College of Surgeons Museum, 2247). He then removed the back of the antrum, but the orbital plate being apparently healthy, he contented himself with scraping it freely and applying the chloride of zinc paste, the age of the patient forbidding removal of the whole upper jaw. Recurrence took place, and he again scraped away the growth and applied the zinc paste, but the disease again made progress, and the patient died worn out within a year of the first appearance of the disorder."

Mr. Butlin (Pathological Society's Transactions, 1881-82) has recorded two cases, one under his own care, and one under Mr. Morrant Baker, the ages being respectively 62 and 85.

Diagnosis.—Primary epithelioma of the gums is difficult to distinguish from some forms of simple ulcers in their early stages. Malignant growths, if limited to a small area, have often much the appearance of aphthous ulceration, but there are many considerations which would guide the surgeon to a correct diagnosis.

In the first place, the age of the patient is a most important consideration, as cancer is very rare in early life, in fact, is very seldom met with before the age of 40, and is more common between 50 and 60, whereas aphthæ and simple ulceration is a disease almost essentially of youth, and under appropriate treatment speedily gets well.

Cancrum oris may be mistaken for epithelioma; here again, however, the age of the patient would almost invariably guide one in distinguishing the one from the other, as cancrum oris is, as aphthous ulcer, a disease of childhood and youth, and may be looked upon as an asthenic degenerating ulcer in a debilitated constitution, which speedily yields to appropriate treatment, whereas cancer resists all treatment, and, as it extends, its base becomes hard, and the ulcer seems fixed and unyielding, while the edges are gristly, everted, and jagged.

Syphilitic ulcers of the gums may usually be distinguished from cancerous by the history. These ulcers are, however, often very puzzling. A case, in a man 63 years old, came under my notice a short time since: he was sent to me, as he was thought to be suffering from malignant disease of the gums and floor of the mouth. The ulceration had many of the characteristic symptoms of epithelioma: There was no history of syphilis, so far as I could find from the man, yet there was that about the ulcerated surface which made me doubt, so I put him on a course of iodide of potassium and perchloride of mercury, with the result that the ulcer gradually assumed a more healthy aspect, and in the course of three or four weeks had quite healed.

This case was a very instructive one, and demonstrated how careful one should be before giving a verdict in a case where there is any doubt whatever, without, in the first place, giving treatment a fair trial.

Treatment.—If seen sufficiently early, the ulcer may be destroyed by the local application of any powerful caustic which will thoroughly destroy the tissues, or by the free use of Paquelin's thermo-cautery. In no case must mild caustic, such as nitrate of silver or sulphate of copper, be used, as they only tend to irritate without destroying the part, and very much more harm is likely to be done than benefit derived.

I, however, infinitely prefer the free use of Paquelin's cautery, over which the surgeon has complete control, he being enabled to destroy just as much as he wishes to, without jeopardizing the surrounding tissues. After the first application the patient must be constantly watched, and if any fresh growth is observed, it must be at once destroyed.

It is seldom, however, that the patient seeks the aid of the surgeon early enough for any kind of cauterization to be effectual, as the disease has too often attacked the alveolus; in these cases the affected part of the alveolar process and jaw must be removed; this is accomplished by making two vertical incisions with a small saw on each side of the growth, being careful to get thoroughly clear of it, and then removing the intermediate portion of bone with bone forceps.

Should the disease have extended deeper, the surgeon must not hesitate to remove the entire portion of the bone so diseased; and here I think it highly desirable to remove, if the growth is situated in the molar region, the affected half of the jaw.

If the disease is limited to the incisor portion of bone, I have seen excellent results from removing the whole of that portion of the bone; the two remaining halves of the jaw are drawn together by their muscular attachment, and soon become united by firm fibrous tissue. A case illustrating this was under my care some two years ago (*vide* Case IV): it was that of a Chelsea pensioner who was admitted into the Cancer Hospital in 1883, suffering from extensive epitheliomatous ulceration of the gums of the lower jaw, the disease corresponding in extent with the incisor, canine, and first left bicuspid teeth, extending along the floor of the mouth as far back as, and implicating, the frænum; the sublingual glands were also affected. I removed the whole of the bone which was implicated; the two halves speedily united, and the man made a good recovery. He, however, had a return in some of the glands eighteen months after, and, refusing to submit to another operation, died about two years subsequent to the operation.

Of epithelioma of the antrum but little need be said, as directly suspicion is excited of the existence of the disease, if it can be corroborated by the extraction of one of the molar teeth, and if the patient's strength will allow of it, the upper maxilla should be removed.

Mr. Christopher Heath, in his work on disease of the jaws, also mentioned several cases in which he has operated with good results, and quotes others in which other surgeons had operated with equally happy results. He says, in ending his remarks on the treatment: "Both in this and in other similar cases I have been disappointed with the operation of removing solely the alveolus, and am inclined to adopt more radical measures at first, in future." In this I fully agree with him, as I consider in this, as in all other forms of cancer, the only hope we have of permanently benefiting the patients suffering from this disease is by free and extensive operations, *i.e.*, thoroughly removing the whole of the cancerous tissues and getting to healthy structures.

CHAPTER III.

CANCER OF THE JAWS.

Both the upper and lower jaw are subject to tumours and growths of various kinds, innocent and malignant, and it is often very difficult to diagnose the one from the other in the early stages of the disease; but it is highly important that such a diagnosis should be made, as what may, in an early stage, be innocent, say, enchondroma or osteoma, is very likely to take on a malignant character.

The jaws are not so frequently the seat of epithelioma as either the lips or tongue. At the Cancer Hospital, in 841 cases of epithelioma, there were only 20 in which the jaws were the primary seat of the disease, or at the rate of only 2·4 per cent., whereas the lips were affected in 18·7, and the tongue in 19·8, per cent.

It will be more convenient for the purposes of this article to describe the tumours affecting the upper jaw first, and then pay attention to those affecting the lower jaw.

Upper Jaw.

The upper jaw is often the seat of *Fibroma, Enchondroma, Osteoma, Spindle-celled Sarcoma, Myeloid Sarcoma, Chondro-Sarcoma,* and *Ossifying Sarcoma* among the so-called non-malignant, and *Round-celled Sarcoma* and *Epithelioma* in the malignant, class.

To enable one to arrive at a correct diagnosis of the malignant from the non-malignant, it will be necessary to give a short account of all the tumours.

Fibroma.—This does not differ in structure materially from fibrous tumours in other parts of the body. It usually arises from some part of the periosteum covering the inner surface of the antrum or the alveolar process, and frequently from the periodontal membrane; it is slow of growth, but invades steadily the surrounding structures. When it arises from the interior of the antrum, it bulges out either the palate or the anterior wall of the antrum, causing a swelling of the face beneath the orbit, which increases slowly and surely. It may also cause absorption of the bones by pressure after a comparatively short time; when it extends on the nasal side of the antrum, it pushes the thin plate of bone and turbinate bones across the cavity of the nostril, and, absorbing these bones, presents itself in the nostril as a polypus, and has not been unfrequently mistaken for one. Should it project upwards it will destroy the floor of the orbit and protrude from its inner margin on to the cheek.

When the tumour arises from the alveolus, it may grow on to both the facial and palatine surfaces, absorbing the bone between it and the cavity of the antrum, and speedily filling that cavity.

The growth of these tumours is very slow, and not attended with any great amount of pain and little or no constitutional disturbance, until it attains such a size as to interfere with respiration or deglutition.

The cause of these tumours is uncertain, but they often follow a blow or some local irritation, resulting from the stump of a tooth, or a decaying tooth.

These tumours, although non-malignant, have the greatest possible tendency to recur, and may, and probably will, do so again and again after removal.

Enchondroma of the upper jaw is a very rare affection, and need not be more than noticed here. On removal it is very apt to recur.

Osteoma may be simply an hypertrophy of the whole or some portion of the bone; it is slow of growth, and quite painless. Tumours of ivory hardness, however, are found springing from the bone, often extending into the orbit, pushing the eye-ball from its place, and causing intense pain. These tumours grow very slowly; thus, as mentioned by Mr. Heath, in a case reported by Mr. Hilton, the tumour had been twenty-three years coming before he saw the patient. Another case, operated on by Sir William Fergusson, the tumour had been twelve years attaining the size. Other cases are also recorded by Mr. Christopher Heath in his work on diseases of the jaws. These tumours, if thoroughly removed, appear to have little disposition to return.

Spindle-celled Sarcoma.—Under this head are included all those cases that formerly were classed under the head of recurrent fibroid and fibro-plastic tumours, the fibro-sarcomata; and undoubtedly many of the tumours which were removed, and considered to be fibroma, were in reality spindle-celled sarcomata. This form of tumour is classed by Mr. Heath among the non-malignant type of tumours, but I very much prefer to include it and all sarcomatous growths with the malignant type, as from their rapid growth, vascularity, and constant tendency to recur, I look upon them as being as dangerous to life as carcinoma.

Chondro-Sarcoma and Osteo-Sarcoma, I am inclined to think, are merely varieties of the same disease, that is, they are sarcomata mixed with cartilage in the one case, and ossification in tumours containing sarcomatous elements in the other. The chondro-sarcomata are very liable to be accompanied or followed by secondary deposits, especially in the lungs; this form is certainly more liable to this than the osteo-sarcoma, although this also is occasionally so followed.

A *Sarcoma* is what Billroth designates a tumour consisting of tissue belonging to the developmental series of connective tissue substances (connective tissue, cartilage, bone), muscles, and nerves, which, as a rule, does not go on to the formation of a perfect tissue, but to peculiar degenerations of the developmental forms.

Green describes *Spindle-celled Sarcoma* as being composed of closely packed, unusually thin, elongated spindle or oat-shaped cells. These cells are, in some cases, very small, measuring only the $\frac{1}{1500}$th of an inch in length, in others longer; in these latter the cells are thicker, and the nuclei and nucleoli are especially well marked, and very often multiple. Usually there is no intercellular substance; occasionally, however, it is met with; it may be homogeneous and soft, or fibrous; if the fibrous portion preponderates, the tumour may be called fibro-sarcoma or fibroma. Thus we see the fibroma are closely allied to sarcoma. These forms of sarcoma are frequently encapsuled, more so than any other form.

They, however, recur again and again after removal, notwithstanding that the surgeon removes what appear to be thoroughly healthy tissues around the growth; thus it is clear that the disease must implicate the surrounding tissues to a very great extent. The lymphatics are not often affected, at any rate not until quite late.

They always spring from the connective tissue, more frequently from periosteum than any other perhaps. Thus, in two cases I operated upon lately, the one was a large growth springing from the periosteum of the spinous process of the lower dorsal vertebræ; this growth had been removed three times before I saw it. Another case was that of a youth, aged 18, who was sent me from Hull, with a large polypus projecting from the nostril, and also extending into the orbit through the lachrymal canal; this growth arose from the periosteum of the middle turbinate bone and superior maxilla. (*Vide* Case No. VII.)

Myeloid Sarcoma is very closely allied to the spindle-celled variety, and is frequently met with in the upper jaw. These growths are nearly always found in connection with bone, and generally in connection with the medullary cavity. They consist of numerous bundles of fusiform cells, similar to those found in the spindle-celled sarcomata, interspersed with large many-nucleated cells, the so-called "myeloid cells," which resemble the cells of the medulla in a state of excessive irritative activity.

In the jaws they are frequently met with springing from the periosteum of the alveolar process, and presenting a fungating growth in the mouth, constituting one form of epulis. A case I saw a short time ago was that of a young woman, aged 32, who had a softish growth presenting just above the alveolar process of the upper jaw. It had, when I first saw it, all the appearance of a gum-boil, and it was incised, but nothing came out. The case was kept under observation for a short time, and as the growth continued to increase, it was decided to remove it. This was done, and, fortunately, it was found to be quite limited in extent to the alveolar process and anterior plate of the antrum. The orbital plate of the superior maxilla was preserved and the growth removed, which, upon examination, proved to be a myeloid sarcoma. The patient made a good recovery, and eighteen months after the operation there was no return of the disease.

Round-celled Sarcoma is softer and more friable than the spindle-celled growths. It is of frequent occurrence in the upper jaw. It is highly vascular, and most rapid in growth, and quite as malignant as encephaloid cancer, for which it is often mistaken. In fact, clinically, it is almost impossible to distinguish the one from the other, neither is it important to do so, as the prognosis and treatment are identically the same.

Microscopically, it is seen to consist of elementary embryonic tissue. It resembles very much the upper layer of granulation, and contains small round cells, like lymph cells. There is scarcely any intercellular substance perceptible. This, however, varies in different cases. Occasionally the cells are larger, and contain large round or oval nuclei with bright nucleoli. Green describes these growths as "of uniform soft hair-like consistence, somewhat translucent or opaque, and of a greyish or reddish white colour. On scraping the cut surface they yield a juice which is rich in cells. They are exceedingly vascular, the vessels often being dilated and varicose, and, from their liability to rupture, they frequently give rise to ecchymosis and to the formation of sanguineous cysts. They grow from the cutis, the subcutaneous cellular tissue, the periosteum, the fasciæ, and connective tissue of organs. They extend rapidly by peripheral growth, infiltrate the surrounding structures, reproduce themselves in internal organs, and often involve the lymphatic glands. From their clinical and physical character, these tumours are very liable to be confounded with encephaloid cancer; they are distinguished by the absence of an alveolar stroma, and by the penetration of the intercellular substance between the individual cells."

The favourite seat of these growths seems to be about the bones, either intra or extra. They are more common in the superior maxilla, perhaps, than any other bone in the body; they usually occur singly, and, when springing from the interior of the antrum, spread very quickly, presenting in the nostrils as a fungating mass, resembling a polypus, very vascular, and readily bleeding if interfered with. They also, if left alone, absorb the orbital plate, pushing the eyeball forward and outward, and often, by absorption of the anterior plate of the antrum, infiltrate the tissues covering the bone and skin, resulting in a large fungating mass on the cheek; the gums become swollen, round or oval, and slightly lobed: as the disease extends, it absorbs the bony structures around, displaces the alveolar process, ascends to the orbit, and sometimes even to the frontal sinuses, blocks up the nares, and sometimes causes obstruction of the pharynx. These growths are most frequent in young persons, and very rare after middle age. They commence usually without any known cause, such as an injury, &c.

They often spring from the posterior surface of the bone, pushing the whole maxilla forward, and in these cases may extend to the sphenoid bone, and, passing through the foramina in that bone, enter the skull. When the growth arises from the surface of the malar bone, it quickly pushes the cheek forward, and spreads to the mouth, involving the soft structures of the face, which may ulcerate. In these cases the superior maxilla becomes affected secondarily. These growths not uncommonly affect the lymphatic glands.

Epithelioma very often attacks the upper jaw, and is found in both the squamous and columnar varieties; the former usually commences in the mucous membrane of the gums or palate, and extends upwards along the sockets of the teeth to the interior of the antrum. The columnar variety commences always from the mucous membrane lining the antrum, or from the nasal fossæ, from thence extending to the palate. Both varieties spread very rapidly, and follow much the same course as has been described of the sarcomatous growths. When removed they are very liable to recur; the lymphatics become affected early in the disease.

This disease is rare in youth, and most frequent between the ages of 50 and 60.

This form of epithelioma is not uncommonly met with mixed with sarcoma, that is, you find columns of small round epithelia with a stroma in which sarcomatous tissue is often present.

Epithelioma is of very rapid growth, and often by pressure absorbs the bony tissue with which it is in contact, thus causing swellings and fungating masses to appear in the palate, which, in their early stages, may be, and often have been, mistaken for abscesses.

The disease at its commencement is unaccompanied by much pain, the patient merely complaining of a dull, heavy sensation in the side of the face, accompanied sometimes by neuralgic pains over the forehead and supraorbital region.

As the disease progresses the pain and sense of weight increase, and eventually the patient may suffer excruciating agony, which nothing but large doses of morphia will relieve.

Diagnosis.—This is no easy matter, and often it is impossible to say for certain whether a tumour of the upper jaw is malignant or not until it has been removed; even suppuration into the antrum or cystic enlargement of the jaw is not always to be diagnosed with certainty from a sarcomatous growth. Should there be any doubt, however, it may be easily removed by extracting the first molar tooth and puncturing the antrum, when the true nature of the disease will be made apparent.

If care is taken, however, the surgeon may arrive at a pretty fair conclusion.

It must be remembered that all the more innocent tumours, viz., fibrous, cartilaginous, and osseous, are slow of growth, more especially the two latter. The general health is good, even though the tumour attain a large size, and the skin and surrounding tissues are not affected or implicated in any way by the disease; whereas, in sarcomata or carcinomata, the growths of both increase very rapidly, the tissues surrounding the tumour become implicated very early, and the growth, if not interfered with, quickly absorbs the bone, and presents itself as an ulcerating mass, either on the face, the orbit, the nostril, or palate. The sarcomatous growths are also very vascular. To distinguish between the spindle-celled and myeloid sarcomata and the round-celled sarcomata and epithelioma is also a most difficult matter; the two latter, however, grow very much more quickly, are more painful, the patient, as has already been stated, complaining, even in the early stages, of violent neuralgic pains and a sense of weight and gnawing about the part affected. It by-and-by presents large fungating masses, either in the nostril, palate, or on the face, whereas the two former never fungate, although they ulcerate through the mucous membrane or skin.

In examining a patient suffering from a tumour of the upper jaw, too much care cannot be taken; the family history might influence you in your decision. *Age* plays a very conspicuous part. The length of time the tumour has been coming is most important. If of considerable size and of short duration in a person over 30, you may at once be sure it is either a sarcoma or carcinoma.

The roof of the mouth and the alveolar process should be carefully examined, to see if there is any bulging of the palate or displacement of the teeth. The general contour of the face should be observed: sometimes there is a trifling fulness, only perceptible to the touch; at others, the swelling may be such that there is no difficulty in seeing it; the eyeball may be very slightly displaced. The nostrils should be most carefully examined, as often the nasal plate of bone of the antrum is pushed inwards, obstructing the nostril before the disease presents itself elsewhere.

Polypi are often present in the nostril, which, if not carefully examined, may be mistaken for growths protruding from the antrum; these can all be easily distinguished by means of a strong light being thrown into the nostril while a probe is passed along to the root of the polyp, when its origin will be made apparent.

The posterior nares should also be carefully explored with the finger, to see if there be any growth extending into the pharynx or posterior nares, either from the base of the skull or the posterior part of the upper jaw-bone.

Prognosis.—Should the patient be seen before the disease has progressed too far, and implicated the surrounding parts, I think complete extirpation of the disease, with, if necessary, the whole of the superior maxilla, gives a fair and reasonable hope of recovery. As in the case I have already mentioned of myeloid sarcoma in a young woman, the disease was removed freely, leaving, however, a portion of the orbital plate. This patient had no return of the disease eighteen months after the operation, whereas, at the time she was operated on, the growth was increasing very quickly. But it is very rarely we see patients so early as this, and if the disease has trespassed beyond the confines of the antrum, and involved the soft tissues around, notwithstanding you may appear to remove the disease very thoroughly and completely, it will almost certainly return. This applies to fibroma, spindle-celled sarcoma, and myeloid sarcoma as much as to the more malignant varieties of disease affecting the bone. This is my reason for preferring to include all these growths under the head of malignant, as tumours which are treated in the same manner, and the prognoses of which are nearly similar, are, clinically at least, identical.

Garretson, in his "System of Oral Surgery," says: "Histologically, tumours found to run into each other in the manner in which these tumours are found to do, no absolute line of demarcation existing between the extremes, should be classed under a common head. Simple fibroma cannot be demarked, as extremes are concerned, from recurring fibroma. Recurring fibroma cannot be distinguished from sarcoma, sarcoma cannot be demarked from encephaloma. Deduction: the most simple of fibroma differ from the most complex of encephalomata alone in feature of expression; the family is one."

Treatment.—Iodide of potassium and iodine have been reputed with the removal of some growths about the upper jaw; in my hands, however, they have utterly failed to arrest, much less cause absorption of, any of the growths, whether simple or malignant. The only means of effectually dealing with these recurring or malignant tumours is by early and free excision.

Operations.—Operations for the removal of portions of the jaw have been practised since the year 1693, when Akoluthus, of Breslau, is reputed to have performed this operation.

Mr. John Lizars, of Edinburgh, as Mr. Christopher Heath tells us, appears to have been the first in this country to propose the removal of the whole of the superior maxilla in the year 1826. Although, however, he ligatured the carotid artery, the hæmorrhage is reported as having been so great that he was obliged to discontinue the operation. In the commencement of the same year, however, M. Gensoul, of Lyons, removed the entire superior maxillary bone, with a part of the palate, successfully from a boy, aged 17, for a fibro-cartilaginous tumour.

The Americans, however, claim the credit of having first excised the upper jaw, Dr. Jameson, an American surgeon, having in the year 1820 completely removed the bone. In 1828 Dr. David Rodgers, of New York, excised both upper maxilla. After this date the operation became thoroughly recognized, it being performed by surgeons throughout England and France and the United States.

Formerly, however, the operation was never performed without in the first place ligaturing the common carotid artery, and it was some time before surgeons dared to excise the bone without having first done so. The actual cautery was always held in readiness as a means of controlling hæmorrhage; now, however, Paquelin's cautery has quite supplanted the old cautery iron.

Excision of the upper jaw is practised chiefly for malignant disease of the bone; but the results are not, on the whole, satisfactory. This is not, however, from the severity of the operation, but from the nature of the disease.

The manner of performing the operation has been varied by different operators. Mr. Lizars made an incision from the angle of the mouth to the malar bone, and reflecting the flap thus made, in cases where the tumour was very large he extended his incision at the malar end by making another at right angles to it extending to about half-an-inch to an inch on either side of the original cut; he also divided the upper lip in the middle line. He then removed the bone by means of the saw and bone forceps, dividing the hard palate and bony attachments at the malar and nasal extremities of the orbit.

Mr. Syme and Liston extended and modified these operations for large tumours. They omitted the vertical incision at the malar bone, and substituted an incision from the external angle of the orbit downwards along the side of the nose around the alæ nasi to meet the incision through the upper lip.

The objection to both these operations is that the facial artery and nerve were divided very low down, resulting in great deformity afterwards. To Sir W. Fergusson undoubtedly is due the credit of having suggested and practised a method of removing the bone whereby this deformity was avoided.

His operation, which is that adopted by surgeons of the present day, was conducted as follows:—He in ordinary cases divided the upper lip in the middle line, and if that did not allow enough room to remove the tumour he made an incision from the inner angle of the orbit down the side of the nose and around the alæ nasi to the nasal extremity of the incision through the lip; he then reflected the large flap thus made and removed the bone. Should the tumour, however, be so large and the orbital plate affected extensively, he made another incision parallel with the orbital ridge of the submaxilla from the malar bone to the inner angle of the orbit; by reflecting this the whole bone is brought into view.

A narrow-bladed saw is then introduced into the nostril, after having removed the two central incisor teeth, the alveolar process is divided slightly to the side of the middle line to which the disease exists, so as not to interfere with the septum nasi; the ascending process of the superior maxillary bone is then divided into the orbit by means of bone forceps, and the malar bone cut through by notching it with the saw and then completing the division with the forceps. The whole bone is then seized with Lion forceps, when it is easily removed from its bed, the soft palate and remaining attachments being severed with the knife. The gap left by the removal of the bone must be filled with lint soaked in carbolized oil, and the edges of the wound brought together with either silver-wire or horsehair sutures, the upper lip being united with hare-lip pins.

During the operation often there is free hæmorrhage, but this is easily controlled by the rapid application of the clamp forceps; and after the flaps have been reflected it is well to ligature the facial and other arteries, which may cause trouble, before dividing the bone. In the later stages of the operation, when separating the bone from the soft palate and other attachments, the internal maxillary may be wounded; this, however, is readily secured on account of the large gap caused by the removal of the bone.

In operating on the upper jaw the surgeon should always endeavour to leave the orbital plate, if possible; also, in small innocent tumours, the alveolar process and palate may often be spared. Thus, recently I succeeded in removing a large spindle-celled growth from a lad, aged 19, without taking away the palate and alveolar process. In these cases, after making the usual incision by the side of the nose and through the upper lip, the surgeon proceeds with a Hey's saw to cut through the anterior plate of the antrum, just above the alveolar process. He then, by means of the bone forceps, divides the process of bone into the orbit, and cuts through the other plates of the antrum, when the growth is easily removed. In the case I refer to the growth sprung from the middle turbinate bone, and forced its way downwards through the nostril outwards, filling the antrum, and upwards into the orbit and œthmoidal cells.

In removing the bone, with a view of preserving the orbital plate, the same incisions are made in the soft parts, and the anterior plates of the antrum divided with Hey's saw parallel with and just below the orbit, the remainder of the operation being conducted as for removal of the whole bone. This operation has been practised for the removal of large fibrous naso-pharyngeal polypi.

For the removal of growths springing from the body of the sphenoid or posterior part of the superior maxilla, Langenbeck has devised an operation which he calls "the osteo-plastic resection of the jaw," and is thus described by Erichsen. His first incision began at the insertion of the ala nasi, and ran along the lower border of the malar bone, describing an arch with the convexity downwards, and terminating at the middle of the zygoma. The second began at the nasal process of the frontal bone, and, following the lower margin of the orbit, crossed the frontal process of the superior maxillary bone, and joined the lower incision. The soft parts were not dissected up. The lower incision was then carried to the bone and the masseter dissected from its attachment to the malar bone. By depressing the lower jaw so as to remove the coronoid process out of the way, the finger can be forced into the spheno-maxillary fossa, which is dilated by the tumour into the nose through the spheno-palatine foramen. A narrow saw is now passed along the finger, its point being protected by the forefinger of the left hand, introduced into the nostril, and a cut is made directly forward through the ascending process of the palate bone and the body of the superior maxillary bone, across the cavity of the antrum, parallel to the hard palate, and immediately above it. The upper incision is now deepened, and the soft parts raised from the floor of the orbit and from the angle between the zygoma and the malar bone, and the saw being again introduced, a cut is made through the malar bone into the spheno-maxillary fissure, and thence across the floor of the orbit as far as the lachrymal bone. The wedge-shaped piece of the superior maxillary bone, included between these cuts, is now only attached by its connections with the nasal and frontal bones, and by the soft parts covering it, which were untouched. By introducing an elevator into the cut in the malar bone the whole piece is lifted up, bending in its attachments to the malar and frontal bones as upon a hinge,.until it is completely turned inwards and upwards over the opposite side of the face. The tumour is then removed from the pterygo-maxillary region, the bone replaced, and wound closed.

Removal of both upper jaws has occasionally been practised. Mr. Lane removed the greater part of both bones in a case of spindle-celled sarcoma, together with the vomer, &c. The tumour implicated both superior maxillary bones and filled both nostrils.

Dr. David Rodgers, of New York, removed successfully both superior maxillas as far back as the year 1824. Heyfelder has performed the operation three times. The method he adopted was to make two incisions from the outer angle of the eyes to the corner of the mouth, and reflected the flap, then made with the nose over the forehead. He then passed a chain saw through the spheno-maxillary fissure on each side, and divided the jaws and malar bones from behind. The junction with the nasal bone and vomer were then divided with the bone forceps, and the soft palate separated from the margin of the hard. Lastly, powerful traction upon the bones was exerted and the whole displaced.

This extensive operation, however, can very rarely be necessary; and if the disease has extended so far as to implicate both bones, I doubt if the surgeon is justified in recommending the patient to submit to such an operation, which, at the best, can prolong his life but a very short period.

In performing these operations about the upper jaw, I prefer the patient being placed in the recumbent position, with his head rather raised. I also, before commencing to operate, plug the posterior nares with a moderate-sized sponge with string attached to it; the sponge must be pushed well up and behind the soft palate, and care must be taken that it is not too large, otherwise it may force the palate down so as to interfere with the breathing when under the influence of the anæsthetic.

The operator and anæsthetist will experience great comfort from this precaution, as the blood by this means is prevented trickling into the pharynx and larynx.

In severe operations it has been suggested to perform the preliminary operation of tracheotomy, and then plugging the pharynx with a large sponge; but, as Mr. Heath has said, "for all ordinary cases of removal of tumours of the upper jaw, the proceeding seems to me uncalled for," and I cannot myself see the object in it; in fact, it appears to me to be subjecting your patient to another and severe operation, and decreasing his chance of recovery materially. And I cannot but think in all ordinary cases the plugging of the posterior nares answers every purpose.

In any case, should it, from the extent of the disease, be thought desirable to perform tracheotomy, the operation, in my opinion, should always be done two or three days before the major operation is to be performed.

The after treatment of these cases I consider of the highest importance.

In cases where there is any suspicion of the disease not having been thoroughly removed chloride of zinc paste should be freely applied, care being taken to put pledgets of lint over and around it, to prevent it running into the pharynx, or on to other healthy surfaces. The whole of the parts should be thoroughly dusted with iodoform, and a most convenient instrument for this purpose is manufactured by Messrs. Khrone and Seissen; by means of this insuflator the powder can be blown freely into any cavity. The whole cavity should be irrigated with Condy's fluid and with a carbolized water twice, or when the sloughs are separating three times a-day, after which the powdered iodoform should be again used.

The patient for the first few days, in cases of complete removal of the bone, should be fed, with an œsophageal catheter, with strong beef tea, milk, and eggs, and, if necessary, wine or brandy.

Lower Jaw.

The tumours affecting the lower jaw are both malignant and innocent. The latter consist of fibrous tumours, which are, perhaps, the most common form of tumour of this bone. These tumours arise externally from the periosteum, and are usually the result of periosteal inflammation caused by a blow or the irritation of stumps of teeth.

When the tumours commence between the plates of the bone they arise from the endosteum, and are the result of constant irritation arising from decayed teeth or old stumps.

In both instances the tumours may attain to a great size without causing any grave constitutional disturbance. They are slow of growth, and are usually found in young persons.

The periosteal tumours in their earlier stages are very like epulis; in fact, it is almost impossible to distinguish the one from the other; neither is it important that such diagnosis should be arrived at, as the treatment is identical, viz., free excision of the tumour and the bony structures to which it is connected.

Enchondroma, as in the superior maxilla, is not commonly met with, but when it does occur, it is somewhat difficult to distinguish between it and fibrous or malignant growth.

Osteoma is met with in two forms: it may be simple hypertrophy of the bone, forming an increase in the cancellated structure; or it may be an ossifying enchondroma; or it may be as an exostosis from the bone itself, in this case the tumour is of ivory hardness. This form is usually met with at the angle of the jaw.

Under the head of malignant tumours of this bone may be included spindle-celled sarcoma, myeloid sarcoma, chondro- and osteo-sarcoma, round-celled sarcoma, and epithelioma. I prefer including all these among the malignant growths of the jaw, for the same reason as adduced for following the plan in tumours of the upper jaw.

Spindle-celled Sarcoma usually commences as a growth protruding between the teeth or in the place of some old stump. As the growth increases in size it soon pushes up the teeth, loosening and displacing them either inwards or outwards. As the growth increases it becomes more or less lobulated, often forming small secondary processes here and there, in the first place covered by the mucous membrane, which, as the disease progresses, assumes a dark purple hue. This is soon succeeded by ulceration, when a fungous growth speedily sprouts out. This, however, does not, as a rule, occur until quite late in the disease. The consistence is firm, and even hard, and not particularly vascular. The growth, if not interfered with, extends somewhat rapidly, filling the mouth, and forcing the jaw downwards and the tongue backwards. In this state the patient is in imminent danger of being killed either by inanition or suffocation, and suffers excruciating agony, while violent neuralgic pains are complained of along the course of the sensory nerves of the face and head.

Even when the disease has assumed these alarming conditions, much may be done to alleviate the patient's suffering, and even to rid him from the disease, by free and bold operative measures.

The structures of these growths are found on section in the early stages to consist of firm elastic tissue, interspersed with gritty matter and small spiculæ of bone, against which the knife grates as it cuts through the growth. There are also generally a number of small cysts caused by the breaking down of the tissues; these cysts are filled with a sanguineous inodorous fluid.

The growth itself is often found to be encapsuled, although pushing itself into the interstices of the bony structures around; it is difficult to demonstrate this excepting quite in the early stages of the disease. Although, I believe, the disease never incorporates itself with the surrounding structures, or assimilates them to its own nature, yet microscopically these growths are identical with the spindle-celled sarcomata of the upper jaw.

Myeloid Sarcoma is comparatively common in the lower jaw, and usually attacks young people under 30 years of age. The disease generally springs from the cancellous structure of the bone, and, when excised with the bony structure to which it is attached, is very frequently entirely removed without fear of recurrence. The growth, if projecting into the mouth, presents a dark purple appearance, sometimes, as described by Sir James Paget, of a mottled red and purple colour resembling some nævi; it is very vascular, bleeding readily if cut. The patient may suffer little or no pain, and will bear a digital examination without complaining of much tenderness.

These growths are very soft, and often contain cysts of varying size. The cut surface is pinkish at the margin, and of a yellowish colour in the centre, due to fatty degeneration. Hæmorrhage very commonly occurs in these tumours, causing purple patches to be seen over the surface.

If not thoroughly removed it quickly returns, but if completely excised it very rarely recurs, either locally or in any internal organs.

It usually commences on one half of the jaw; sometimes it originates in the symphysis; and occasionally, as in a case reported by Mr. Christopher Heath, it is present on both sides. The case referred to by Mr. C. Heath is that of a boy, aged 7½ years, who was under his care suffering from a remarkable enlargement of both sides of the lower jaw. When a year and a-half old the mother first noticed an enlargement first on one side (right ?), and then on both, which has been gradually increasing. He has never complained of any pain, but had a good deal of difficulty with his teeth. He was rickety in his legs. The tumours were smooth on their outer and lower parts, but slightly nodulated at the upper. Within the mouth they extended up to the level of, but did not encroach upon, the teeth. He had cut his permanent first molar and incisors; the temporary canine and molars were still present and somewhat decayed. Mr. Heath operated upon first one side and then the other, sawing away the prominent portions with a narrow saw, and then with gouges and bone forceps removed as much of the semi-cartilaginous structure as he could without interfering with the teeth or opening the mucous membrane. This boy did remarkably well, and is reported as being free from any return of the disease at the time of the publication of Mr. Heath's work, seventeen years after the operation.

A good specimen of this disease attacking the lower jaw is shown in University College Hospital Museum, No. 680, and is thus described:—

> "The left ramus of a lower jaw, with an adjoining part of the body about two inches in length. Immediately in front of the ramus the body of the jaw, with the exception of its lower border, is expanded by the growth of a small myeloid tumour which has protruded above through the alveolar process, so as to form a second superficially lobulated and somewhat flattened mass, covered with mucous membrane, and overhanging that part of the growth which is inclosed by the bone.
>
> "The parts were removed, for the disease shown, by Mr. Liston."

Chondro-sarcoma is not nearly so commonly met with as the two last forms of sarcoma; it is usually, as its name infers, a mixture of enchondroma with round and spindle cells interspersed throughout the tumour; in the primary stage the cartilaginous structure is largely predominant, but after removal, on the tumour recurring, the character is much altered, and the round cells, with some spindle cells mixed in a fibrous stroma, are the prevailing elements of the tumour, the cartilage cells being comparatively few. This form of tumour is very liable to recur again and again after removal, and each time, I think, with more malignancy. Its growth is very rapid from the commencement.

The exciting cause is commonly a blow, or some injury to the bone itself. Its usual site is the angle of the jaw, and as it grows it pushes out the outer plate of bone, forming a large, prominent, usually lobulated, tumour over the parotid region. It may, and often does, project into the pterygoid region, causing pressure upon the pharynx and base of skull.

The patient suffers great pain, often of a neuralgic, lancinating character, extending over the course of the sensory nerves of the head and face. Numbness of the chin is also complained of, the result of the tumour compressing the inferior dental nerve. These tumours are usually met with towards middle life. The lymphatic glands here, as in the spindle and myeloid variety of sarcoma, are not commonly affected.

Osteo-sarcoma, so called on account of the growth occasionally becoming ossified extensively in its matrix. This is by no means a common disease, and is very difficult to distinguish from osteoma. It increases in size more rapidly; the original tumour is not nearly of such rapid growth, however, as the recurrent disease after removal of the primary tumour: it, like enchondroma, is very liable to recur after removal, and the primary disease is chiefly composed of bony tissue, mixed with round and spindle cells, in a fibrous stroma. The recurrent tumours have very little ossific matter in them, and are chiefly composed, as the recurrent enchondroma are, of spindle and small round cells in a firm fibrous matrix, with certainly a fair quantity of rudimentary bony tissue.

These tumours are most frequently met with in people past middle age, and the exciting cause is usually attributed to a blow or injury of some sort, or exposure to cold. The patient complains, in the first instance, of pricking pains in the jaw, but the tumour being usually sub-periosteal much pain is not complained of, at any rate in the early stages of the disease.

Round-celled Sarcomata were formerly classed as medullary or encephaloid cancer, and not uncommonly attack the lower jaw. They are usually found in young people.

These tumours are exceedingly vascular, and sometimes distinct pulsation is to be felt in them. They usually commence in the periosteum, in which case they speedily surround the jaw, and ulcerate through the mucous membrane of the mouth, and even through the cheek, presenting a large fungating mass either in the mouth or externally, bleeding readily, and discharging a sanious offensive matter.

They, however, most frequently commence in the interior of the jaw, and then, growing rapidly, the jaw expands, forming only a thin shell of bone over the tumour, which speedily breaks down, and, as in the former case, a large fungating mass presents itself. In University College Museum there is a good illustration of this, and here, as in the case of myeloid sarcoma, I cannot do better than give the description of this specimen as it appears in the catalogue:—

> "666. The right half of a lower jaw, on the body of which a long oval tumour has grown. The morbid growth projects chiefly on the outer side, and its most prominent part has protruded through the skin, forming an overhanging nummular projection, which has an open reticular surface. On the inner side the tumour has invaded the jaw, in places destroying its entire thickness; the growth, however, scarcely projects into the cavity of the mouth. As seen on the divided surface it is composed of a soft, granular, yellowish basis, supported and parted into small polyhedral masses by narrow lines of fibrous tissue; its limit is everywhere definable. Microscopic examination shows the tumour to have all the characters of a large round-cell sarcoma.
>
> "The parts were successfully removed from a woman 60 years of age. The patient was under the care of Mr. Liston."

These tumours not only often pulsate, but to the touch have an elasticity which closely resembles fluctuation, so much so that I have on several occasions known the tumour to be punctured to ascertain if there were fluid in it or not.

Round-celled sarcomata are of very rapid growth and malignant nature, and after removal are most liable to return again and again. During their growth they encroach upon the tissue around and infiltrate it with disease, so that it is very difficult to be sure of complete removal of all the disease. They also very frequently recur in internal organs, and this is not difficult to understand: on account of its extreme vascularity, the cells may easily be conveyed to the lungs or other parts by the blood-vessels.

The lymphatics, although often affected, are not commonly so. The case of a child who was sent to me a short time ago well illustrates this. It was a child about 1 year and 7 months, who was sent to me with a swelling on her right temple, presumably an abscess. The mother first noticed a small lump, the size of a pea, on the right temple, on the 31st August, 1883; it increased in size rapidly, and on the 14th September the child was brought to me. The swelling was then about as large as a chestnut, looking at first sight like an ordinary abscess. It was somewhat tense, semi-elastic, with *apparently distinct fluctuation.* The veins over the tumour were very much enlarged and prominent, and there was a sensation on palpation which made me suspect that there was no pus, but that the tumour in all probability was malignant—most likely medullary cancer. On the 21st the child was brought to me again; the tumour had then grown considerably; the skin in places looked thin and shiny. *Very distinct fluctuation* existed over the whole tumour, but more so on these spots. The swelling now extended forwards as far as the orbit, upwards to the temporal ridge, and downwards to the malar bone. The veins over the whole tumour were much enlarged and very prominent, and another swelling of the size of a nut had formed on the top of the head, apparently under the pericranium. I determined to puncture the tumour with a grooved needle to ascertain the nature of the contents, but only a little bloody serum escaped.

On the 24th a small swelling made its appearance behind the right ear; the tumour on the temple had much increased in size, and the eye was now very much protruded. The two tumours on the head had nearly joined each other. From this time they increased rapidly in size, pushing the eyeball further and further out of the orbit until it fairly lay upon the cheek. The child had no convulsions, but gradually sank, and died on the 13th October, exactly five weeks after the mother first noticed the little swelling on the temple.

Post-mortem examination revealed a large mass of disease compressing the right hemisphere of the brain, quite a cup-shaped depression being formed. On section it was found to be soft, almost of brain-like consistence, very vascular, of a reddish purple colour, and interspersed with fine fibrous bands. Microscopically, it was seen to consist of numerous small round cells closely packed in a thick fibrous matrix. (*Vide* Pathological Society's Transactions, vol. xxxv, page 363.)

The treatment of this disease of the jaw consists in as complete removal as possible, removing the bone well clear of the disease on either side; and here I would strongly advise and advocate the removal of the entire half of the jaw on which the disease exists, as I contend it is impossible to know whether one is free from the disease or not, unless this is done. I would, therefore, in all cases, divide the jaw well to the opposite side of the middle line of the symphysis to that on which the disease is situated, and disarticulate the jaw on the same side. By this means only, I contend, can we expect to free our patient from the disease.

Epithelioma is the only form of cancer which is found in the lower jaw. It exists in two forms, viz., the squamous and columnar-celled, the former being very much the more common form of the disease, as the jaw is more often the seat of cancer secondary to the growth existing in the gum and floor of the mouth, than it is as a primary disease commencing on the bone itself. When occurring as a primary growth it is of the columnar type, and usually occurs in connection with either multilocular or simple cysts in the bone. Although the squamous variety is usually secondary to ulceration of the gums or floor of the mouth it occasionally occurs as a tumour, and then is usually found to exist at the angle of the jaw or the ramus of the bone. The three cases mentioned in the Appendix well illustrate the forms of squamous epithelioma that are met with secondary to cancerous growths in the lips and gums.

The disease in either form is most rapid in growth. When commencing in the bone itself it speedily attacks the alveolus, loosening the teeth, and causing the gums to bulge and appear as a tumefied mass: the bone (as illustrated in Case VI) is speedily destroyed, and spontaneous fracture is not an uncommon occurrence. The disease, as it progresses, very shortly forms fungating growths into the mouth; the pain is often most excruciating; there is a constant discharge of putrid matter, the patient having the greatest difficulty in taking nourishment, even in a liquid form. The growth extends to the fauces, and death from inanition, or probably septic poisoning, ensues. The lymphatic glands are usually very early implicated, the submental and submaxillary being usually the earliest affected. The glands in the neck quickly follow, and although when the disease is removed there may be no enlargement of the glands perceptible, yet, soon after, to the chagrin of the surgeon, the patient presents himself, perhaps with the wound of the operation completely healed, but with enlarged glands under the angle of the jaws.

Early and complete removal is the only treatment to be adopted in these cases, and here, as in cases of round-celled sarcoma, I would insist upon the entire half of the jaw being excised upon which the disease exists.

Epithelioma rarely attacks people before middle life, and is very much more common between the ages of 50 and 60 than at any other time of life, the average age being, as shown by the statistics at the Cancer Hospital, 51·39 years.

Diagnosis.—The diagnosis of malignant disease of the lower jaw is comparatively easy, certainly very much more so than those of the upper jaw. In the case of all malignant growths the disease extends very rapidly, and is accompanied, as a rule, with much pain; their boundaries are ill-defined, as often the surrounding tissues are more or less infiltrated with the disease. In the case of epithelioma this is especially the case, and in this form of malignant growth the lymphatic glands are early implicated. Epithelioma also is rarely met with before middle life, and most frequently after the age of 50.

The sarcomata are, on the contrary, usually met with in early life. They grow rapidly, and have very early a tendency to ulcerate through the mucous membrane of the mouth, or even the skin of the cheek, when large fungating growths form, which are very vascular, discharging an offensive sanious matter, and often bleeding freely.

The simple tumours are of slow growth, cause very little pain or even inconvenience, are circumscribed in extent, and very rarely cause ulceration of the skin or mucous membrane excepting if they are allowed to extend without being interfered with; then from simple pressure the skin may slough, and the tumour present an appearance much resembling a sarcoma; in fact, I am strongly inclined to think that these tumours, if left so long unheeded, often take on a malignant character. Innocent tumours are nearly always met with in young people under 30 years of age.

Rapidly-growing tumours of the lower jaw, with ill-defined boundaries, and an elasticity to touch, occurring in young people, may with tolerable certainty be diagnosed as round-celled sarcoma.

Growths increasing rapidly, early affecting the lymphatic glands, and infiltrating the surrounding tissues, occurring in people past middle life, may with equal certainty be ascribed to epithelioma.

Prognosis.—If the disease, whether sarcomatous or carcinomatous, is seen sufficiently early, there is a very good chance of the surgeon being able to remove the whole of the growth with a fair prospect of its not recurring. The prognosis is infinitely more favourable here than when the disease is situated in the upper jaw, as, from the anatomical relations of the bone, the surgeon is enabled more effectually to remove the whole of the affected parts of the bone.

It is a question whether, if a bone is affected with malignant disease, and the whole bone is not removed with the growth, the portion left is not liable to take on the disease. Thus, in cancer of the tibia or femur, it is a rule that the surgeon should remove the limb at the joint above the disease, viz., the knee-joint or hip-joint.

Now, if this rule is to hold good in the lower jaw in case of malignant growth of that bone, the surgeon should remove the whole jaw; but it must be remembered that at birth the lower jaw is practically composed of two bones joined at the symphysis, and thus I think it is not at all necessary in these cases to remove more than half the jaw; at any rate, in my experience I have never known the disease to recur in the portion of bone remaining; if it recur anywhere, it is in the sympathetic glands and tissues around them.

That the outlook in any case is not good we are bound to admit, and in advising patients as to the best course to pursue we must always take rather a gloomy view of the result, and point out that, in all probability, the disease will return sooner or later.

At the same time, however, we can fairly say that we may be able to prolong life for a year or two, and, in any case, relieve the patient from much pain and suffering.

Treatment.—Here, as elsewhere, we can do little or nothing to get rid of the disease by the aid of drugs. Much may be done, however, to relieve the terrible sufferings of the patient, and I think also in retarding the disease, by the free use of morphia, while the strength is maintained by arsenic, quinine, cod-liver oil, and a good nutritious diet.

The only means at our disposal at present which gives any chance of eradicating the disease is by free and early removal of the affected parts; and here I would say surgery is able to do very much, if not actually to permanently free the patient from the disease, at any rate to prolong life. Thus, Mr. Christopher Heath narrates, in his work on diseases and injuries of the jaw, several cases in which he operated on patients suffering from cysto-sarcoma of lower jaw, with recovery:—

A case of *epithelioma of lower jaw and floor of mouth,* in which he removed the disease, and the patient two years after was in a satisfactory condition.

Myeloid sarcoma of both sides of the lower jaw, in which he removed both growths, and the patient did well.

Epithelioma of the tongue, involving the lower jaw, in which case he removed the growth and three inches of the jaw successfully.

Epithelioma involving the chin and lower jaw, in which the growth was removed by section of the bone and galvanic écraseur without opening the mouth; this patient recovered, but had a recurrence of the disease some months afterwards.

To these may be added the cases I notice in the Appendix. The one, an old Chelsea pensioner, with epithelioma of floor of the mouth and anterior part of jaw, in which I removed the diseased portion of bone, and the patient made a good recovery; the disease, however, recurred in the submental gland eighteen months afterwards, and he died.

Another case, under the care of my colleague, Mr. Hayward, in which the floor of the mouth and symphysis of lower jaw were affected, the disease was removed, and the man made a capital recovery.

Another case, that of a man in whom I removed the whole of the lower jaw for epithelioma, the bone being affected secondarily to epithelioma of the lip. This case was most successful.

These cases are sufficient to prove that removal of malignant disease of the lower jaw is not only justifiable, but the best possible results may be obtained.

The question of how much of the bone should be removed is still open to doubt. Mr. C. Heath, in many of his cases of malignant disease of one side of the jaw, contented himself with sawing through the condyle of the bone, and not disarticulating it. Dividing the bone at the symphysis, he removed the intervening portion which was diseased. I am strongly of opinion, however, that it is better to disarticulate the bone on the one hand, and divide it slightly to the opposite side of the symphysis to which the disease exists on the other. I do so, as I consider by this proceeding you stand a far greater chance of removing the whole disease, and thus placing your patient in a better position to avoid recurrence.

When the disease is limited to the symphysis, however, it would be certainly most unjustifiable to remove the whole bone; and, as in the cases mentioned by me, most happy results may and have been obtained by dividing the jaw on either side of the disease, taking care to cut the bone at a sufficient distance from the growth. The disease, in this situation, is nearly always secondary to growths of the gums or floor of the mouth, and therefore is limited in the majority of cases certainly to the cortical portion of the bone and not have penetrated into the medullary or cancellous structures, and thus is not so likely to have affected the neighbouring parts of the bone through the lymphatics or blood-vessels.

Operations.—The operation of partial excision of the lower jaw was first practised by Anthony White at Westminster Hospital in 1804; then by Deadrick, of Tennessee, who in 1812 excised the half of the bone from the symphysis to the angle. At about the same time Dupuytren performed a similar operation in Europe, but to the first-named surgeon is undoubtedly due the merit of having been the first to perform the operation. We find that Professor Mott, of New York, performed a similar operation to Deadrick's in the year 1821, but, according to Professor Smith, Mott disarticulated the bone. In the year 1850 Dr. Ackley, of Cleveland, Ohio, is reported as having removed the entire bone.

Dr. Deadrick performed the operation on a lad, aged 14 years, for the removal of a cartilaginous tumour on the left side of the jaw, which nearly filled the whole mouth, causing the greatest difficulty in swallowing, and at times even in breathing. The operation was performed by Dr. Deadrick making an incision from below the zygomatic process, and carrying it across the tumour downwards and forwards to nearly an inch beyond the middle of the chin. From the centre of this incision, and at right angles to it, an incision was made a short distance down the neck; the flaps thus secured were dissected from the diseased mass, and the bone sawed through at the angle, and the symphysis, and the intervening piece of bone, with the tumour, removed; the flaps were then laid back in the usual way, and the boy made a speedy recovery.

The growths for which excisions of the jaw are performed are usually situated on one side or the other of the bone, not very often extending beyond the middle line. The operation necessary for removing these growths are therefore limited to either complete or partial excision of one half of the bone.

It does, however, occasionally, as in the case of M. N.,* although this, fortunately, is of very rare occurrence, become necessary to remove the whole of the bone.

In epithelioma it not unfrequently happens that the symphysis alone is the seat of the disease, in which case that portion of the bone only requires excision; and it may happen in these cases that it may be found practicable to remove all the diseased parts, leaving a small bridge of bone at the lower portion of the maxilla, which prevents the two sides of the jaw being drawn together by muscular action, and also maintains its natural formation.

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* *Vide* Appendix of Cases.

The operation for complete removal of the symphysis is performed by making an incision through the lower lip, in the middle line, to about half-an-inch below the chin, dissecting the two flaps thus made from the diseased bone, and, after passing a strong silk ligature through the tongue, to prevent it being drawn back into the pharynx, sawing through the bone, with either a Hey's, metacarpal, chain, or circular saw, on either side of the mass, detaching it from its muscular attachment in the floor of the mouth by a few touches of the knife. The lip should then be brought together with hare-lip pins, and the ligature through the tongue either fastened to the pins, or, as I prefer, to the forehead, by a piece of adhesive plaster.

If it be decided to excise only the alveolar portion of the bone, it can best be removed by dividing the bone vertically, after extracting two teeth on either side of the diseased mass, with a metacarpal or Hey's saw, as deeply as you may require; then, with a circular saw, cutting the bone horizontally through between the two vertical cuts; the piece of bone is then easily removed.

The surgical engine which is used for driving the circular saw, drills, &c., is the invention of Mr. W. G. A. Bonwill, D.D.S., and the introducing of it into surgical practice is claimed by Professor Garretson, of Philadelphia. He describes it as follows: "While a dental engine is worked by the foot, or by an electric, steam, or motor power, and possesses but a single driving-wheel, the surgical machine is driven by means of a hand-crank, and is intensified in motion by the addition of a cog adjunct. The shaft of the latter is always of arm fashion, the cable of the former, as at present constituted, being too weak to accomplish other than operations demanding little mechanical power."

In removal of half, or a portion of half, of the jaw, it will be sufficient, as a rule, to make one long curved incision from a point opposite the articulation of the bone, along the posterior and under margin of the tumour as far forwards as the symphysis.

In making this incision, the facial artery is necessarily divided; this should be at once clamped with the clamp forceps and tied. The flap being then dissected up from the growth, the jaw is to be divided slightly to the opposite side of the symphysis to that on which the tumour is, and, if the growth be small, the bone may be again sawn through at the angle, or at any point higher; should the disease be extensive, I think it always safer to disarticulate the bone, and remove the whole. If it is decided to divide the jaw on either side of the tumour, it is advisable not to completely divide it on the one side before sawing through the bone on the other, on account of the loss of resistance consequent upon breaking the continuity of the jaw, the bone being easily finally divided with the bone forceps. In making these incisions it will be necessary to remove a tooth at the points where the jaw is to be divided.

Should the tumour be large, and it is deemed desirable to disarticulate the half of the jaw, it will be better to make a vertical incision through the lip, meeting the curved incision at right angles below the chin. The flap being dissected from the tumour, and the incisor tooth removed, the jaw is to be sawn through with an ordinary Hey's or metacarpal saw, and the bone, being seized with the Lion forceps, is drawn forcibly outwards, whilst the soft structures are divided close to the inner surface of the bone by a few touches of the knife, care being taken to keep close to the bone to avoid wounding the lingual artery or submaxillary gland.

The internal pterygoid muscles having been carefully separated from the jaw, the bone is to be forcibly dragged downwards, so as to depress the coronoid process when the tendon of the temporal muscle will be brought into view ; this is to be divided, when the joint will be exposed ; this must be opened with the knife, when the condyle will be easily displaced, and the ligaments behind being cautiously divided, the bone will be easily wrenched out. Care must be taken not to twist the jaw outwards, or there will be a danger of lacerating the internal maxillary artery and causing troublesome hæmorrhage.

Dr. Gross recommends the use of a flat bone-elevator to clear the coronoid process and condyle, and thus avoid danger to the artery. Mr. Christopher Heath, having employed this plan on several occasions, strongly recommends it.

Some surgeons recommend the stripping off of the periosteum in some cases ; this certainly must never be practised in the case of malignant disease of the bone.

In cases of cancer of the lower jaw, it is not infrequent for the bone to break at the angle directly the surgeon puts any pressure upon the distal end. This occurred to me in the case of M. N. The Lion forceps can, however, then be applied to the ramus of the jaw, and a good leverage obtained.

In large tumours extending up the ramus of the jaw, and implicating the coronoid process, it is often found to be most difficult to free that process from the zygomatic fossa, and dislocate the bone. Under these circumstances, it will become necessary to divide the coronoid process with the bone forceps and remove it later on, after the jaw has been disarticulated.

Sir William Fergusson recommended, in very large tumours of the lower jaw, that a long semi-circular incision should be made from the zygoma around the tumour to a point in a line with the angle of the mouth on the opposite side of the jaw, thus avoiding the division of the lip. I do not, however, see any advantage in this operation, as the wound in the lip always heals well and leaves very little scar. Mr. Syme and Professor Humphrey removed the ramus and condyle of the jaw without opening the mouth, through an incision in front of the ear.

The whole of the lower jaw may be removed by a circular incision extending from a point over the articulation on the one side, extending downwards and below the tumour, around to a point opposite the masseter muscle on the other, stopping just short of the facial artery.

If care be taken in dissecting up the flap, this artery need not be wounded. In turning up the flap the whole of the lower lip is dissected up and drawn well upwards over the face, thus giving ample room for the operator to see what he is about, and enable him to disarticulate the bone first on one side and then on the other. If there should be much difficulty in doing this, the operation may be much expedited by dividing the jaw at the symphysis, and removing first one half and then the other.

Numerous contrivances have been invented to prevent the half of the bone which is left being drawn across by the muscles to the side from which the diseased half has been removed, in the shape of metallic caps, suggested by Nasmyth, of Edinburgh, which were so contrived as to fit the teeth in the upper and lower jaw; Cartwright suggested a vulcanite cap with the same view; but all of these cause so much pain, and directly they are left off the jaw is still drawn over, that I consider that it is far better to leave things alone, and allow the bone to be drawn in.

After-treatment.—The wounded surfaces should be well dusted over with iodoform, a full-sized drainage-tube introduced at the most dependent part, and a piece of protective placed over the wound, the edges of which should be brought together with silver-wire sutures about an inch apart, with a few intermediate horsehair sutures. If the lower lip has been divided, it should be united with hare-lip pins in the ordinary way. Carbolic, corrosive sublimate, or some other antiseptic gauze, should be applied over the whole, and a soft Gamgee's pad placed over that, and a bandage lightly applied to support the parts.

The patient's mouth should be kept well irrigated with boroglyceride lotion or a solution of Condy's fluid.

His strength should be maintained with good nutritious diet, such as beef tea, milk, eggs ; and here I would express most strongly the desirability of not allowing the patient to take any food into his mouth, but that he should be fed entirely by means of the œsophageal tube, or, what I use as a substitute, a full-sized gum elastic catheter, fitted by means of a piece of india-rubber tubing, with a small funnel; the catheter can be easily passed into the œsophagus by the nurse, and liquid food administered.

If the patient is fed in the ordinary way with a feeding-cup, the milk and egg naturally gravitates into the wound, and causes much trouble, as it is most difficult to keep the mouth clean by any amount of syringing.

Should the patient's temperature rise, and any signs of septic mischief set in, large doses of quinine, three to five grains, must be given with the beef tea or food every three or four hours ; by this treatment the temperature is usually soon reduced.

I do not advocate the use of stimulants in these cases unless the patient's strength is found to be failing, in which case brandy in small and repeated doses will be found of great service.

CHAPTER IV.

CANCER OF THE TONGUE.

THE tongue is peculiarly liable to be the seat of cancer, which is always of the squamous-celled epithelial type, scirrhus being rarely, if ever, met with in this organ. Thus, out of 190 cases collected by me as occurring at the Cancer Hospital, only one was ascribed to scirrhus, and in this case no microscopical examination of the growth was made. I should therefore be very much inclined to think it was not scirrhus. Of 66 cases collected by Mr. Barker, from the University College Hospital Case Book, one is described as distinctly of the nature of scirrhus. All observers, however, are agreed on this point, that the tongue is liable to be attacked by epithelioma alone of all the forms of carcinoma. Sarcoma of the tongue is likewise very rarely met with. Professor Jacobi, of New York, in the "American Journal of Obstetrics" for 1870, reports a case, however, of an infant, in which the day after the child was born a tumour the size of a hazel nut was discovered. It grew somewhat rapidly, and Dr. Jacobi removed it with the galvanic écraseur when the child was two or three months old. The growth was examined microscopically, and pronounced to be one of sarcoma, being made up of tissues comprised partly of round, but chiefly of spindle cells, with but little intercellular substances.

Mr. Hutchinson contributed to the Royal Medical and Chirurgical Society, in the latter part of the session of 1884-85, a case of a medical student who had a morbid condition of the tongue from early life. The condition would appear to have been one that may have been regarded as a congenital mole having a tendency also to a nævoid condition, in which a sarcomatous growth developed in the ordinary course of life. There was nothing except the size of the tumour to excite much alarm about it. There was no ulceration and no glandular enlargement. The removal of this very large, if not the largest, tumour of the tongue on record (weighing seven ounces) could only be effected by the division of the lower jaw and preliminary tracheotomy. The operation was successfully accomplished, and the patient enjoyed the next two years of his existence apparently in the best of health. At the end of two years the growth recurred at the cicatrix, and caused death by its rapid development. The microscopical examination proved it to be of a sarcomatous nature.

Mr. Barker and Mr. Butlin have each met with one case of lympho-sarcoma of the tongue; and Mr. Eve has recently contributed two cases to the Pathological Society.

Epithelial cancer is more frequently met with in the tongue than any other organ or part of the body excepting the uterus. Thus, in 860 cases of this disease collected from the Cancer Hospital Case Book, 190 were situated in the tongue, or at the rate of 22 per cent. The tongue also stands very high in the scale as compared with other organs affected by any form of cancer.

At the Cancer Hospital, out of a total of 2,227 cases of cancer I have collected and analyzed as occurring in patients at that hospital during the last ten years, the tongue has been the seat of the disease in 190 cases, or at the rate of 8·5 per cent.

The mammæ were attacked, the right in 315 cases, the left in 308 cases. Both breasts were the seat of the disease in 25 cases, and the breast and axilla in 49 cases, making a total of 697 cases so affected, or at the rate of 31·3 per cent.

The uterus was the seat of the disease in 274 cases, or at the rate of 12·3 per cent.

We cannot do better than compare these figures with those collected by Mr. Sibley, Sir James Paget, Von Winiwater, Mr. Morris, and Mr. Arthur Barker, and it is interesting and satisfactory to observe how nearly similar the total results of these observers are with my own. In Mr. Barker's 343 cases he noticed as many as 16·3 per cent. of cases of cancer of the tongue; whereas Mr. Sibley, in 520 cases, found the tongue affected in only 2·6 per cent.; Sir James Paget obtained a result of 6 per cent.; Von Winiwater, in 548 cases, showed a return of 8·3 per cent.; and Mr. Morris, in 501 cases, collected at Middlesex Hospital, found 7·1 per cent. In the numbers collected by all these surgeons, amounting to 2,412, we have a result of 8 per cent. of cases of cancer affecting the tongue, or only 0·5 per cent. less than those collected in my 2,227 cases.

	Dr. Sibley, 520 cases, 1853–56.	Sir J. Paget, 500 cases, 1843–61.	Von Winiwater, 348 cases, 1867–76.	Mr. A. Barker, 343 cases, 1871–81.	Mr. Morris, 501 cases, 1872–81.	Mr. Jessett, 2,227 cases, 1872–81.
Breast....	36·5	55·2	32·4	36·7	51·4	31·3
Tongue	2·6	6·0	8·3	16·3	7·1	8·5

One cannot but be struck, on examining the above Tables, at the exceedingly low percentage of cases in Mr. Sibley's list, and the high rate in Mr. Barker's, whereas the percentage of cancer of the breast is the same. It is difficult to account for this, unless, as Mr. Barker suggests, many of the cases coming to University College Hospital are sent from Wales, and possibly miners may be more prone to cancer of the tongue than other people. I have been in correspondence with some of the medical men in Wales, but have failed to obtain any confirmation of this hypothesis. It is, however, suggestive, and a point well worthy of further inquiry. This very high rate of Mr. Barker's is the more extraordinary, as we find the rates obtained by Sir James Paget, Von Winiwater, Mr. Morris, and myself practically the same.

Etiology.—It is not to be wondered at that the tongue should be a favourite seat of cancer; indeed, we can only be surprised that it is not more frequently attacked, and that the form of malignant growth should be limited to epithelial cancer. There is no organ in the body which is subjected to such rough treatment, and from its structure and surroundings one can understand how suitable a situation it must be for the growth of the disease. It has, first, what we may call its natural enemies, carious and broken teeth, whose rough, sharp edges are constantly wounding and irritating it; the large quantities of tartar which so frequently collect around the teeth (especially the back of the lower incisors) is a constant source of irritation to the tip of the tongue.

Surgeons or general practitioners cannot be too alive to these sources of evil, and recommend any patients who may consult them for ulcers or soreness of the tongue, if there be any carious teeth or collection of tartar, to go at once to the dentist to have the offending tooth or substance removed. Dentists are often too apt to cut off old, decayed teeth, leaving the diseased stumps in the jaw for the purpose of getting a better foundation for the plates. This practice cannot be too greatly deprecated, as the diseased stumps are often the foci from which spring malignant disease, and the gums are always kept in a state of constant inflammation, and apart from the danger already alluded to, the stumps become more and more absorbed, and eventually have to be removed, and then the plate is useless. Whereas, had the dentist made a clean sweep of the stumps in the first place, the gums would become hardened, and the plate would last for years. I have seen many cases of epithelial cancer of the gums spreading to the floor of the mouth and tongue commence in this manner. Of that I am convinced.

Among the extraneous sources of irritation are false teeth, and plates which frequently fit very imperfectly, and are often, among the lower classes, made of inferior materials.

Another point I would like to mention is, that it is the practice of some people never to remove their plates and artificial teeth from their mouths, by which means the gums become spongy, foreign matter accumulates under the plate, and the plates themselves often become completely fixed with tartar deposited around them. A gentleman recently consulted me for an ulcer under his tongue. On examination I found he had had a plate fixed to his lower jaw with two incisors and some molar teeth on each side. His dentist told him not to remove it, which instruction he strictly observed, with the result that he had an epithelial cancer form under his tongue. The plate was thickly incrusted with tartar, the gums were spongy and inflamed, and altogether he was in a terrible plight. This disease was undoubtedly due to the indiscreet advice of his dentist.

Smoking is another common source of irritation, more particularly the short clay pipe, the tip of the tongue being constantly placed against, and playing with, the jagged end of the stem, causing, in the first instance, a blister or an excoriation.

Professor Ludwig has shown that carbonate of ammonia, carbolic and acetic acids, which are present in the acrid products of dry distillation of tobacco-smoke, are very injurious. The prolonged action of these substances upon the tongue often give rise to a kind of chronic superficial glossitis or icthyosis glossæ, which, as has been shown by Messrs. Clarke and Eve, may be the exciting as well as the predisposing cause of epithelioma. Burns of the tongue are very apt to become the centre or starting-point of epithelioma; so also are bites repeated at any one spot. Ardent spirits are another cause, especially, as is too often the case, when taken neat. Hot condiments, pepper, chillies, pickles, and the like, are also pungent substances that may well be classed among the irritants of the tongue.

From these we may pass to the constitutional causes that are likely to favour the development of cancer of the tongue. Among these may be classed phthisis, syphilis, and heredity.

Phthisis.—There is no doubt in a large percentage of cases of cancer generally, and, therefore, in cancer of the tongue, the patients are at times the subjects of phthisis or have a phthisical history. We cannot, however, look at this as anything more than a coincidence, as undoubtedly there are a far larger number of people who have a phthisical history that never develop cancer. I am strongly of opinion, however, that if a patient contract a tubercular ulcer of the tongue, that such ulcer is very likely to take upon itself all the characters of epithelioma, more so, certainly, than a simple ulcer. I would, therefore, in cases of tubercular ulcer, unless it speedily heals under treatment, strongly recommend its early removal. We must not, however, on this account fall into the error, should a malignant growth follow a tubercular ulcer, that the cause of the cancer was in any way connected with the phthisical diathesis of the patient, but merely the result of the irritation of the ulcer upon a debilitated constitution.

Syphilis.—Here, again, we have a specific poison in the system; and a fairly large percentage of cases suffering from epithelioma of the tongue have a history of syphilis; but then, on the other hand, as in phthisis, there are a far larger number of people with syphilitic taint who never have any malignant ulcer of the tongue. So I think here we have no right to say that the syphilitic poison has anything whatever to do with the production of cancer of the tongue. Here, however, as in phthisis, if the tongue is affected with syphilitic ulceration or gummata, there is a very fruitful source of irritation, which may prove a good soil for the development of cancer. Such a case was shown at the Pathological Society by Mr. Morrant Baker in a man who had been under his care at St. Bartholomew's Hospital ten years previously with syphilitic gummatous ulcer of the tongue, in which unmistakable carcinoma had formed on the scar of the former disease.

Ichthyosis is a not uncommon forerunner of cancer of the tongue; we are not, however, in a position to say that ichthyosis must necessarily be followed by cancer. I have seen, however, cancer frequently develop upon an ichthyotic patch. I have likewise often seen cancer on a tongue affected with ichthyosis, where the latter disease remained unchanged around the cancerous ulcer. We cannot say, therefore, that ichthyosis and cancer are identical, although no doubt they are pathologically very closely allied to each other, and therefore it must be looked upon as a strong predisposing cause of cancer.

Heredity.—How far heredity may be a predisposing cause of cancer of the tongue I am not at present prepared to say, for I do feel, if there is any part of the body in which the local origin of cancer may be expected, it is in the tongue; but I am certainly inclined to think that people with an hereditary tendency may be, and probably are, more prone to develop here as elsewhere cancerous ulcers from local irritations than persons who have no such tendency.

It would appear, then, that epithelioma of the tongue is connected with, or caused by, some form of local irritation, and this result may be produced without there being any hereditary taint in the system whatever; but I am strongly of opinion that where there is a family history of cancer, that an individual is much more prone to the disease than one who has no such family taint. It is true that a history of cancer in a family of any given person suffering from epithelioma of the tongue is quite the exception. Herr von Winiwater states that inheritance is excluded in almost all his cases, while in those collected by Mr. A. Barker and Mr. Morris family taint is absent in 42 cases, doubtful in 31, and positive in only 4 cases. In the face of this, Mr. Barker says that "it would appear as though the occurrence of cancer in the families of those who have the disease in the tongue was little more than a coincidence." I do not, however, altogether agree with him, as a large number of persons who present themselves to our notice know little or nothing of their family history. They do not know what their parents died of. It may therefore be fairly argued that many cases who give no history of cancer in their families may really have such taint.

Sex.—Epithelial cancer of the tongue is very much more frequent in men than in women; in the 190 cases above referred to, 163 occurred in men, and only 27 in women; being in the proportion of seven men to every woman so affected. It may be argued that this is very likely to be the case, as men from their habits are much more likely to have their tongues injured or irritated by smoking, drinking neat spirits, or from syphilitic ulceration, than women, and, therefore, they are much more likely to contract cancer. Such is not the case, however, as the disease is found in men who do not smoke and are not addicted to taking spirituous liquors or exceed in any way, while women who are addicted to these habits do not have cancer. Cancer, moreover, may be caused, as has been already said, by the irritation of rough or carious teeth, and it can scarcely be argued that men are more liable to this form of irritation than women.

On comparing the number of cases of women affected with cancer of the tongue with men similarly attacked, collected from the Case Book at the Cancer Hospital by myself, with those reported by other observers, we find very much the same results, as the following Table will show:—

TABLE of Cases of Cancer of the Tongue, showing the Proportion of Men to Women, collected by

	Males.	Females.	Total.
Clarke, Fairlie	28	11	39
Von Winiwater	43	3	46
Barker, Arthur, University College Hospital	55	5	60
Rose	6	5	11
Paget, Sir J.	19	11	30
Morris, Henry	48	13	61
Woélfer	48	....	48
The Author, Cancer Hospital	167	23	190
Total	414	71	485

From the above Table, it will be seen that these observers have collected a total of 295 cases, of which 48 were present in women, and the remaining 247 in men, thus giving a percentage of 15·6 women and 84·4 men. This result tallies very closely to that arrived at by myself in the 190 cases collected. In these it will be seen there were 23 women and 167 men affected, giving a percentage of 13·8 women and 86·2 men.

Age plays a very prominent part in our diagnosis. If a patient over 40 presents himself to our notice with a papillomatous infiltration, no matter how limited, and there is no visible local cause of irritation, we must look with considerable suspicion upon such a nodule; and, further, if such a nodule or ulcer does not disappear or diminish in size in the course of a few days or a fortnight, we may be so certain of its character as to warrant our excising it as speedily as possible. The oldest patient I can find recorded in the Cancer Hospital, out of the 190 cases I have collected, is 79, and the youngest 32; the average age of the whole number is 52 years. In the total of 133 cases collected by Dr. Gross, he found 82 were above 50 years of age, and 51 under that age. The oldest was

78 years of age, and the youngest 29. In 58 cases collected by Mr. Whitehead, the oldest was 76, and the youngest 30.

Physical Characters.—Epithelial cancer of the tongue is met with chiefly under three forms: the one as a soft, warty excrescence; the second as a large, deep, sloughy sore, with jagged, irregular edge, and hard, indurated base; and the third as a firm, hard, dense mass, which contracts the tissues of the tongue together, and resembles dense cicatricial tissue. This latter is the form that formerly was confounded with scirrhus.

The disease commences, as a rule, in one or other of the ways to be mentioned, all of which revert, sooner or later, to a common type. In the first, a small nodule forms just beneath the epidermis—never deeply in the tongue substance; in the second, a small fissure or ulcer is the first sign of the disease, which is most difficult to distinguish from a simple ulcer, and still more so *per se* from a syphilitic or tubercular ulcer. In a third, the permanent or papillomatous form, which has no appearance of a malignant growth at first, but which speedily develops into a typical epithelioma. This form is generally on one side of the dorsum of the tongue, very far back. I had a very typical example of this form, which came under my notice some time ago, and which will be found related later on. The last form is very much less frequent, and usually associated with ichthyosis leucoplakia. It is accompanied by a general rawness of the dorsum of the tongue, with here and there indurated spots. I have only met with one case of this form of epithelioma of the tongue.

The two first forms attack chiefly the top or edges of the tongue, are much more commonly met with, and are more rapid in their progress, and the submaxillary glands become very much earlier infiltrated with the disease. The two latter are very insidious in their progress, and patients suffering in these ways often go on for some length of time without seeking advice, and when they do so the disease is often not recognized. The lymphatic glands in these forms of disease are not affected until much later.

Thus, in 81 cases, the histories of which I have collected, the lymphatic glands in the neck and submaxillary region have been enlarged in 40 cases; of these 81 cases, 16 commenced as warty growths or nodules, 45 as ulcers or cracks, 10 as blisters or papillomatous growths, 5 as general soreness of surface of tongue, and the remaining 5 were attributed to injury to the tongue.

Of the five which commenced with a general soreness of tongue, the glands were not affected in a single instance, while in the ten attributed to blisters or papillomatous enlargement, only in one case were the glands affected, thus fully endorsing the view that epithelioma of the tongue commencing in these ways, the glands are very much more rarely affected than when the disease commences as a nodule, which speedily breaks down into an ulcer or a fissure.

This view is also endorsed by Mr. A. Baker, whose careful observations we can always so fully rely upon. Thus, he says that "out of 13 cases in which it is distinctly stated that the glands were not enlarged, 8 of the ulcers belonged to the large superficial kind, and only 3 were of the deep variety. And, on the other hand, in 42 cases in which it was noted that the glands were affected, only 11 were of the large shallow variety, while 26 were of the large deep kind, and 5 were small and deep; there being no glandular enlargement with the small shallow ulcers."

The experience of other observers fully endorses these conclusions. We may, therefore, conclude that the deeper the ulcer the more likely are the glands to be affected, and this is very important to bear in mind, as it must guide the surgeon in his advice; as, undoubtedly, the inference to be drawn is, that whereas we may in the shallow varieties give treatment a good trial without running any very great risk of placing the sufferer in a worse condition than he was, yet in those cases which present themselves with deep ulcers the sooner they are removed the better it must be. It is only by constantly examining these ulcers that the surgeon is able to diagnose them in their early stage ; yet it is of the highest importance that they should be recognized as early as possible and removed.

Seat.—In examining 81 cases which I have collected of epithelioma of the tongue, I have found the disease present on either one or other border or edge of the tongue in 55 instances, on the tip in 8, on the dorsum in 10, on the under surface or frænum in 5, and in the floor of the mouth in 3. It will be seen, therefore, how very much more frequently the edges or borders are affected than is the body of the organ. This is what one would naturally expect, for, as has been shown before, the chief cause of cancer of the tongue is constant local irritation, keeping up an inflammatory action in some one part of the organ, and the sides of the tongue are much more exposed to this source of irritation from carious and jagged teeth and from the ends of clay pipes than either the dorsum or the under surface.

	Barker.	Morris.	Author.	Total.
1. On dorsum of tongue	....	4	10	14
2. On tip of tongue	1	4	8	13
3. On edge of tongue	19	25	55	99
4. On under surface	....	1	5	6
5. On under surface and edge	1	1	....	2
6. In the substance	5	5	....	10
7. On floor of mouth and tongue	2	3	3	8
8. As a general soreness, with fixation of tongue	8	2	....	10
9. Part not mentioned	20	4	....	24
	56	49	81	186

It has been shown by some German authors, as well as by Mr. Barker, that the right side of the tongue is more frequently affected than the left; Mr. Morris, however, did not find this the rule. In my own cases the side has often not been mentioned, therefore I am unable to corroborate or deny Mr. Barker's statement; neither do I think it at all material.

The method in which the disease commences is interesting, and here I am able to compare the initial stage of the cases collected by myself with that of Mr. Barker and Mr. Morris :—

	Barker.	Morris.	Author.	Total.
1. As a small fissure or crack ...	4	28	45	77
2. As a pimple or small tubercle	17	7	16	40
3. As a nodule or blister	7	8	10	25
4. As an ulcer spreading from the floor of the mouth	2	3	....	5
5. As an ulcer spreading from the pillars of the fauces	....	1	....	1
6. As a general soreness or feeling of rawness	8	2	5	15
7. As an ulcer spreading from a wound or injury	18	....	5	23
	56	49	81	186

It will be thus seen that nearly half of the total number of cases above referred to commenced as a fissure or crack, while in 21·5 per cent. of the cases the initial stage was attributed to a pimple or small tubercle, and 13·5 per cent. to a nodule or blister. As, however, no doubt a large number of these cases attributed to fissure or cracks really commenced as tubercles, pimples, or nodules, the percentage of the last causes of origin should be very much increased. We should therefore look with extreme suspicion on cases that present themselves over 45 years of age who have these indolent fissures, or hard nodules, and to excise such diseased parts as early as possible. The next most frequent way in which the disease commences is from an injury or cut. We must therefore look with great anxiety on any such injury to the tongue that takes on an ulcerative character.

In whatever form the disease commences it is nearly always seated more on one side of the tongue than the other, and if left to itself will soon run into an ulcer of characteristic type, which spreads somewhat quickly into the floor of the mouth, extending to the jaws or fauces, fixing the tongue and causing exquisite pain, and from the nature of the ulcerated surface the smell is most offensive, and saliva is constantly dribbling from the mouth. The ulcer is usually very ragged, with large, reddish granulations interspersed with sloughy shreds of broken-down material with hard, indurated base. The tongue, in the more advanced stages, may be entirely or nearly eaten away, leaving a deep, filthy, sloughy, ulcerated surface, occupying the whole of the floor of the mouth. The submaxillary and sublingual glands are deeply affected, and very shortly the glands in the anterior triangle of the neck become infiltrated with the disease, even down to the clavicle. These glands are situated chiefly around the sheath of the vessels.

These conditions may be confounded with broken-down gummata, or tubercular ulcer, as has been referred to in the early part of these remarks. Gummata are, however, usually seated more in the body of the organ, are generally for some time present as a smooth elastic lump, accompanied with no ulceration, when it softens, breaks down, and forms a deep, sloughy ulcer. The history of syphilis also is a sure guide to the nature of the disease, and with appropriate anti-syphilitic treatment the ulcer soon improves.

The tubercular ulcer of the tongue is not at all commonly met with. It is as a rule seated on the back of the dorsum of the tongue, although I had a case recently under my charge with a typical ulcer situated in the left border about half-an-inch from the tip. These ulcers are most difficult to distinguish from cancer, but the edges are not so jagged, and the base not so indurated or sloughy, but has a peculiar boiled sago-like appearance.

People suffering from cancerous disease of the tongue suffer excruciating torture, and from the extremely offensive discharge their existence is intolerable to themselves and a burden to all that are nearest and dearest to them. So much so, that they often pray to have any operation performed, in the hope, if no actual good results are obtained, at any rate their suffering may be somewhat relieved. Their general health early fails, their appetite disappears, and from the fœtid breath constantly inhaled they become more or less poisoned, and die either from exhaustion or septic pneumonia.

It is not easy to estimate the natural duration of this disease, as under different circumstances, age, strength, and capacity of endurance, must necessarily play an important part as to the time a patient may resist its exhausting influences. From six to eighteen months may, however, be taken as about the usual mean length of time in which a patient may live after the ulcer has once taken a firm hold and is not interfered with by operations. The majority will certainly die in less than a twelvemonth.

Dissemination of the disease is very rare. This, as Mr. Butlin has pointed out, is extremely uncommon where the disease is limited to the tongue. In one case, which died sixteen months after the commencement of the disease, cancerous deposits were found in the left supra-renal cavity, but in this case the microscopic character was not conclusive. Mr. Butlin mentions one or two other cases in which secondary deposits were found in the liver and rib. He examined Middlesex Hospital Reports for eight years, and from these he collected nineteen cases of patients who died from cancer or epithelioma of the tongue, either in cases unoperated on or those of recurrence. In every case the lymphatic glands were infiltrated with cancer cells. In only two of them were there secondary deposits in other organs. In one case a solitary mass, of small size, was found in the liver; in the other, many growths in the pleuræ and lungs; in the first case the disease had existed for about one, in the latter for between two and three years. We may regard epithelioma of the tongue, therefore, as a disease which eats away the substance of the organ, extending into the neighbouring parts, and implicating the cervical and submaxillary glands, but rarely is it disseminated in other organs of the body.

This is, I think, a strong argument why, in cancer of the tongue, early and free excisions should be practised.

I have in no case seen secondary deposits in other organs of the body after death, when the primary cancer is limited to the tongue.

I look upon cancer of the tongue, therefore, as a local affection, most dangerous to life, not from its power of disseminating the disease through the body, but, by the position it occupies, preventing the sufferer from taking nourishment, and constantly poisoning his system by the fœtid saliva and discharges which are swallowed and the septic secretions which enter the lungs. He is also worn out by the constant excruciating pain, which is not limited to the diseased parts themselves, but extends to the ear, temple, and occiput, so that relief is only obtained by his being constantly kept under the influence of large doses of opium, unless, indeed, the diseased portions are removed by surgical interference or the gustatory nerve divided, as recommended by the late Mr. Hilton and Mr. Moore.

Diagnosis.—The tongue is subject to cracks and ulcers, either simple, syphilitic, tubercular, or caused by the irritation of a carious jagged tooth, an ill-fitting plate, or some foreign substance in the mouth. These ulcers and cracks are often difficult to distinguish from cancer. Hard nodules and warty growths are also frequently met with in the tongue substance which are by no means easy to diagnose, whether they are malignant, deeply-seated abscesses, or encysted growths.

Cracks and fissures occurring under the age of 30 may as a rule be at once arranged among the non-malignant class, and will be found speedily to heal by appropriate treatment.

In the case of simple ulcers the difficulty of diagnosis is often greater than in either of the above-named forms of ulcer, as there is no history to guide one, and it is well known how frequently a simple ulcer or fissure takes on a malignant aspect. The edges are not, however, usually so deep or indurated, and the base of the ulcer is more uniform. In all cases of doubt I would recommend you to adopt Mr. Butlin's plan of scraping the ulcer and examining the *débris* under the microscope; as Mr. Butlin asserts in many cases he has succeeded in distinguishing between the malignant and tubercular or syphilitic ulcers, I think we should always adopt this method. Much, however, may be learned by inquiring into the history of the case. Syphilitic ulcers are very common, but here there is always a distinct history of syphilis, and from the other symptons of secondary syphilis, there is, as a rule, but little difficulty in arriving at a correct conclusion as to the true nature of the ulcer. If, says Mr. Butlin, the scraping from a tubercular or syphilitic, or a simple ulcer, is placed in a tiny drop of water on a glass slide and examined first with a low and then with a high power, pus and blood corpuscles are observed with *débris* of food, schistomycites, and a few normal, or almost normal, epithelial scales; if now the scrapings from a carcinomatous ulcer are substituted, highly characteristic appearances are observed. Pus and blood corpuscles, *débris* of food, and schistomycites are still present, but in addition, or, to speak more correctly, holding the most prominent place both in numbers and importance, are many epithelial scales, no longer normal, but differing in character widely from normal epithelioma of the tongue and the adjacent parts in almost every respect. The cells vary greatly in size and shape; some of them are flattened scales, others are rounded or oval, others are elongated, with truncated or long tapering ends, others again bulge at one end and are caudate at the other end. The contents vary as much as the shape and size; the protoplasm is generally granular, often coarsely so. There may be two or three or more nuclei, and the nuclei, whether there be one or many, are much larger than those of the normal epithelioma of the tongue. The nucleoli are often as large as the natural nuclei. Mother cells are often present, and not uncommonly the cell-nest, which are so characteristic of squamous-celled carcinoma.

The ulcer caused by a jagged tooth or foreign body, often most angry looking, with deep jagged edges, very painful, easily bleeding, is generally readily distinguishable, as the source of mischief and irritation is palpable, and upon its removal the ulcer speedily heals. These ulcers, if neglected, and the cause of irritation is allowed to remain, frequently take upon themselves a malignant character. This form of neglected irritation, indeed, is, in my experience, one of the most frequent precursors of cancer of the organ. It is, therefore, most important that this should be borne in mind, and if at any time a tooth is found decayed, and presenting a sharp, rough surface, it should be at once extracted.

In all these cases a mouth wash of boro-glyceride, or chlorate of potash, is most useful in promoting healthy action in the ulcer.

Deeply-seated abscesses, or encysted tumours, are often very difficult to diagnose with certainty, until the surgeon has cut down upon them.

A case was sent me a short time since from the country. A young man, æt. 29, who had a small, hard nodule, of the size of a nut, situated in the right border of his tongue about an inch from the tip. There was much pain at times, not increased by pinching. However, no fluctuation could be distinguished. There was no external cause of irritation; in fact, it had all the appearance and feel of a scirrhous nodule. On passing a grooved needle into it, pus escaped; the abscess was then laid freely open, and a speedy recovery followed. These abscesses, or encysted growths, usually occur in the tongue substance (more in the centre of the organ), a situation which is rarely the seat of cancer. Usually, indistinct fluctuation or elasticity can be felt in these tumours, when, by passing a grooved needle or a fine aspirating trocar into them, their true nature is discovered, and by freely opening them, as in the case above narrated, a speedy cure is effected.

Syphilitic Ulcers.—Primary syphilitic sores are occasionally met with on the tongue ; I have in the course of my practice met with such on a few occasions; happily, however, this is a rare form of ulcer. When it does occur it is usually situated at the tip of the organ, whereas carcinoma more frequently occurs further back. The glands are enlarged very early, and usually secondary symptoms appear.

Tertiary syphilis, in the form of gummata on the tongue, are more difficult to distinguish, as they present many of the characteristics of that form of cancer of the tongue which appear as a lump in centre of the body of the organ. A careful inquiry into the history of the case, and the more than probable existence of some other form of syphilitic disease being present, is usually sufficient to enable a correct diagnosis to be made. Moreover, if any doubt exist, a week or ten days' treatment with anti-syphilitic remedies would, if the case were specific, effect a reduction of the gumma.

When gummata are broken down and ulcerated, the difficulty of distinguishing them from carcinoma is very much increased.

The positions of gumma are, however, nearly always in the centre of the dorsum of the tongue, whereas carcinoma is usually situated more on one side. There is often more than one gumma present, while it is rare to find more than a single carcinomatous ulcer. The base of a gumma is not so hard and indurated as cancer, and its edges are usually more undermined ; the glands in gumma are not very often enlarged, while in cancer they are always sooner or later affected. The history of the patient is often nearly conclusive, and if the case is treated with large doses of iodide of potassium, much benefit will follow.

Tubercular Ulcers I believe never exist as primary growths, but are always secondary to tubercular disease of the lungs. Thus, by a careful inquiry into the history of the patient, together with the character of the ulcers, usually the surgeon is enabled to arrive at a correct conclusion as to its nature.

These ulcers are, however, often very difficult to distinguish. Here, however, under the microscope, bacilli may be discovered which would at once settle the question. I have never seen the submaxillary or cervical glands enlarged in this class of ulcer. The history of the patient also is of the greatest possible assistance, as the following case well illustrates :—

James J——, aged 54, married; occupation, stonemason. *Family history.*—Patient states that his father was killed in a railway accident, and was, up to the time of his death, a healthy man; his grandfather, on his father's side, lived to be over 90 years of age; his mother is living and in good health, and there does not appear to be any family history either of phthisis or cancer. Patient had syphilis twenty years ago, and there is now a scar on the penis where the sore was situated. He states that the secondary symptoms, &c., were very mild. The patient states that up to the winter of 1882 he enjoyed fairly good health. About the end of November of that year he began to be troubled with a hacking cough, and as time went on he noticed that occasionally a little blood was mixed with the expectoration; he has never coughed up much blood. In January 1883 he first attended the Hospital for Consumption, and continued to attend there as an out-patient until May, when he went to Ventnor, where he stayed nine weeks. On his return to London his lung condition was better, and since that time he has never spat up any blood. At the same time that he began to attend the Hospital for Consumption he "knocked off work," and, as he says, "had little else to do but smoke." He smoked a short clay pipe, and about the end of February or the beginning of March he first noticed a slight soreness on the left side of the tongue. This condition he put down to irritation from this pipe, and he states that he has often had small sores on his tongue in former years, due, as he believes, to smoking. He was in the habit of touching these sores with nitrate of silver, and they used to get well. He treated this last sore on the same lines, but unfortunately without the same satisfactory results. The ulcer remained small, and was treated by various applications. After his return from Ventnor his tongue was worse, and the ulcer had increased in size.

On admission into the Cancer Hospital on the 4th November, 1883, patient had an ulcer on the anterior part of the left margin of his tongue, measuring about three-quarters of an inch in length, and about half-an-inch in width at the widest part; the floor was comparatively clean, and had a rosy, slightly nodular aspect; the edges were somewhat thickened, but not irregular, everted, or undermined, but shelved down to the floor of the ulcer. There are no enlarged lymphatic glands. On examining patient's lung there was found to be marked dulness over the left apex, and also for some little way below the clavicle; there was also increased vocal resonance over the same area; breath sounds feeble, but no crepitations, and no signs of a cavity. Patient in answer to questions states that he has got considerably thinner during the past twelve months.

December 13.—Since admission the ulcer has remained more or less stationary.

Literature is, so far as I know, absolutely silent upon this disease, and, with the exception of a short notice in "Holmes' System of Surgery," by Mr. A. E. Barker, I have failed to find reference to the disease in any English text-book. A most interesting discussion, however, took place at the Pathological Society, in session 1883-84, in which I showed the case, the history of which I have given, and cases were also shown by other surgeons.

The seat of these ulcers are chiefly at the tip or anterior border of the tongue, upon, or encroaching on the under surface, sometimes spreading over the latter.

The ulcer commences in the submucous tissue, usually as a small, hard nodule ; often there are several of these ulcers, with considerable induration of the base. The tissue is not destroyed, as a rule, very deeply. The most characteristic point about the lesion is the appearance, in most cases, of small secondary spots breaking down round the first. The edges are abrupt, deep, red, and much indurated and everted. The lymphatic glands are rarely affected, and never indurated. In the case given above the ulcer had been present for over ten months, yet there was no enlargement of any of the submaxillary or cervical glands.

These ulcers are, I believe, always secondary to deposits of tubercle in the lungs, and I am inclined to think that the ulcer is originally a simple one, and becomes tubercular by being inoculated by the bacilli in the sputa which is continually being ejected from the lungs. In the above case the man had had numerous ulcers on his tongue, but they had always healed readily until, his lung mischief increasing, one of these ulcers took upon itself a tubercular form.

If, then, a patient presents himself with an ulcer on the tip or side of the tongue, with no history of syphilis whatever, and with unmistakable signs of phthisis, I think you may suspect that such ulcer is probably tubercular.

These ulcers are very difficult to heal, and although you may considerably improve the general condition, yet the ulcer is obstinate and spreads steadily; this is the result of the bacilli which are constantly eating their way into new healthy tissues. It must not be forgotten, moreover, that tubercular ulcers are very liable to take on a malignant character. If, then, after two or three weeks' treatment, the ulcer still has a tendency to increase, you must at once decide to remove it, and that pretty freely, so as to be clear of all deciduous tissues. The wounded surface should be kept sprinkled with iodoform, to prevent the possibility of further inoculation by the bacilli of the lung, and it will be found speedily to heal.

Warty growths are often very difficult to distinguish from cancer—the more so, perhaps, as a simple wart is known not uncommonly to pass into a cancerous growth. Here, however, if there is any doubt, the microscope should be applied; but Butlin does not rely upon this so much in cases of warty growths as he does in distinguishing ulcers. In any cases of doubt, however, I would strongly recommend that the wart be scooped out, being careful to cut well into the healthy tissue of the tongue around the wart.

Treatment.—Little, I fear, can be done medicinally for the cure of cancer of the tongue, although by the use of sedatives much relief from pain may be afforded to the patient. I have seen the most benefit derived from the free use of arsenic and phosphorus; the former, in combination with the chlorate of potash or bromide of potassium, and morphia, perhaps is attended with the best results.

℞	Liq. arsenicalis	♏v.
	Potas. chlorat.	gr. xv.
	Potas. bromid.	gr. xx.
	Vel	
	Liq. morphiæ	ʒj.
	Aquæ	℥j.

To be taken three times a-day, at meals.

The arsenical preparations are especially applicable when the disease commences as a general soreness of the tongue, or as icthyosis.

If the patient is anæmic, the arseniate of iron, in sixteenth-of-a-grain doses three times a-day, is to be preferred.

In cases of doubtful ulcers, it is always well to give, either by itself or in combination with Donovan's solution of arsenic, large doses of iodide of potassium, from 5- to 10-grain doses, three or four times a-day.

The action of drugs must not be depended upon, but in a questionable ulcer, possibly syphilitic or tubercular, you should try the use of specific treatment; but do not waste more than ten days or a fortnight, at the end of which time, if the ulcer shows no disposition to heal, you must at once have recourse to operative measures, and remove the diseased part freely, being careful to cut well into the healthy tissues. And here let me lay down one hard-and-fast rule: *never on any consideration make use of caustics of any kind*, as they are utterly and absolutely useless —in fact, by their irritation, *often do harm and never any good.*

From what I have already said it will be seen that epithelioma of the tongue, if left alone, will extend, sometimes very quickly, at others more slowly, but always surely, into the whole substance of the organ and surrounding parts, and early attacking the submaxillary and cervical glands, and so surely destroying life in a comparatively short time. I, however, regard the disease as a local affection, so far as it does not, or very rarely, attack any other organ in the body; and I therefore consider, if the disease is removed early enough and thoroughly, there is little chance of its returning in the site of the cicatrix, although possibly the lymphatic glands may be already affected. This is corroborated in practice, as I have seen several cases in which a diseased mass has been freely removed. when at the end of a twelvemonth or two years there has been no return in the floor of the mouth whatever. Mr. Butlin, in his work, has recorded a number of cases where the patient was apparently perfectly free from the disease at periods varying from one to four years after the operation; and in all these cases careful microscopical examinations were made, and the disease demonstrated to be undoubted epithelial cancer.

Patients, however, very frequently seek relief for ulcers of the tongue which have all the appearance of cancer. We shall do well, therefore, in every such case, carefully to examine and see if there is any predisposing or exciting cause of irritation to originate and prevent such an ulcer from healing. If such is found to exist it must be at once removed, and the ulcer treated with soothing washes. In such cases the surgeon will often be rewarded by seeing the ulcer heal quickly and well.

In all cases, smoking, the use of alcoholic drinks, and hot condiments must be strictly prohibited.

At present, however, we have only to deal with the question of how, with our present knowledge, we can best relieve patients who come under our care. The early removal of nodules or papillomatous infiltrations of the tongue should be insisted on as all-important, for if a nodule is removed, and is afterwards discovered to be benign or innocent in character, how much the worse is the patient for the loss of it? *Not one iota!* Whereas, if this apparently innocent nodule be left alone, it may at any moment take unto itself a malignant character.

It is unfortunately very rarely that we are able to see patients at this early stage, and when we do it is difficult to impress them with the gravity of the import of these small nodules or ulcers until the former have ulcerated, and they have both infiltrated considerably into the substance of the tongue.

The ulcerated surface is generally on one side or the other of the middle line, and I think a very important point to observe in removing the diseased portion is to excise it sufficiently widely, and another important point is to divide the tongue a little to the opposite side of the middle line to that in which the disease is situated, and remove it as far back as possible.

The stage, however, in which we most frequently meet with cases is when the disease has spread considerably into the tongue substance, and the submaxillary, and probably the cervical glands, are affected and infiltrated with the disease, and the floor of the mouth often deeply affected. The question that then arises is, Are we justified in operating at all?

Whether by removing as much as possible of the loathsome mass which is embittering the days of the unfortunate victim, torturing him probably with the most excruciating pain, preventing him taking sufficient nourishment to keep body and soul together, and at the same time slowly poisoning him by the filthy discharge. In such a case we are often sorely taxed to know what to do for the best. We know full well, if left alone, the patient will soon die a most miserable death ; at the same time, we also know that we cannot by any operative measures free him of the disease. But cannot we do much to mitigate his suffering ? Even in such a case as this, by freely removing the diseased parts, we often get a fairly firm cicatrix in the mouth in the place of the foul, sloughing, diseased organ ; and although the disease is sure to progress in the glands that we cannot remove, yet the last days of this miserable patient may be by this means made comparatively comfortable.

Should, however, the disease have extended still further, and we decide that it is not justifiable to interfere with a view of removing any of the diseased tissues, or the patient is too exhausted from the constant discharge, inanition, and probably lung complication to undergo such a serious operation, can nothing be done to relieve him ? Yes, I think so. By Hilton's or Moore's operations of dividing the gustatory nerve, and if there is hæmorrhage, of ligaturing the lingual arteries, much may be accomplished to relieve pain and suffering. It has been shown that by division of the gustatory nerve not only is the pain relieved, but the secretion of saliva is considerably diminished.

Of course, in all cases such as these, constant irrigation of the parts with weak solution of some form of antiseptic is all-essential. Subcutaneous injections of morphia will also go far to alleviate his agony.

No drug, however, has yet been discovered which has any effect in curing cancer; but if cancer is, as I believe it to be, a constitutional (I use the term here in its widest sense) and not a purely local disease; if such is the case, the time may, and probably will, come when some drug will be discovered which will arrest, if not cure, the disease.

Only just lately, Dr. Bandeiro, surgeon to the Hospital Pedro II, in Pernambuco, Brazil, has written extolling the use of the juice of the alveloz as an external application in certain forms of epithelial cancer of the lips, nose, face, and eyelids, but not so successful in ulcerated sarcomas or carcinomas not of the epithelial variety. Some has been sent to the Cancer Hospital, Liverpool, where doubtless it will be tried, and the result reported in due course. I have receïved some of this preparation from Brazil, and I am now trying the effect of the drug at the Cancer Hospital, Brompton, and hope in a short time to be able to report upon the value of it.

Mortality.—Before entering into the question of operative procedure, it will be well here to inquire into the mortality after the operation of removal of the tongue, either in part or as a whole; for this purpose I have collected all the cases I can find recorded in the medical journals and from other sources, and compared them with results of 50 cases occurring in the practice of the Cancer Hospital during the years 1882-83-84, and with the observations of other authorities.

TABLE of Deaths after Operation for Removal of the Tongue from all Causes.

	Collected by Mr. A. Barker.	Collected by Dr. Gross.	Dr. Scäpher's Cases.	St. Bartholomew's Hospital, 1884.	University College Hospital.	Cancer Hospital.	Collected by the Author.	Total.
Number of cases	218	244	50	13	21	50	43	639
Died	35	56	11	2	8	8	13	133
Death-rate	16·9	22·9	22	15·38	38	16	30·2	20·7

Thus the total number of cases, amounting to 639, give a death-rate of 20·7 per cent.

From the preceding Table, it will be seen that the death-rate is somewhat high, but in this Table it must be understood that all cases are included, and many undoubtedly were operated upon simply as a palliative measure to free the patient from the loathsome disease which filled his mouth, and also to relieve the excruciating agony which many must have suffered from. Such was the case in those recorded from the Cancer Hospital; several undoubtedly died directly from the result of the operation, either from secondary hæmorrhage or septic pneumonia, the former surely a preventable cause, and the latter one which experience teaches us to escape to a much greater extent than heretofore. In dressing the raw surface, formerly I trusted entirely to washing the mouth out after the operation with a solution of permanganate of potash, or chlorate of potash; now, however, iodoform is freely sprinkled over the wounded surface, and the mouth washed repeatedly with boro-glyceride or a weak solution of carbolic acid. I formerly strictly forbade patients taking nourishment by the mouth for at least four or five days; they were fed during that period entirely with nutritive enemata, with the result that they lost strength during these few days, and therefore ran much greater risk of contracting a low form of pneumonia. Now, I invariably feed my patients at once through the stomach by means of a simple contrivance of an ordinary gum elastic catheter, to which is attached by means of a piece of elastic tubing a small funnel: this catheter is easily and without the least pain, or even discomfort, passed into the œsophagus, and beef tea, eggs whipped up in milk, conveyed readily into the stomach without coming at all into contact with the wounded floor of the mouth. This contrivance is so simple that a nurse can with ease use it after being shown once or twice; in fact, the patient after a few days passes the tube for himself. Under these improved methods of after-treatment, I have no doubt whatever that the death-rate after operations for removal of the whole or a part of the tongue will be very much less than it hitherto has been.

Operations.—I will now pass on to describe the different operations which have been practised for removal of the tongue or a portion of the organ, and will compare the results of the operation by different methods, and then endeavour to arrive at some conclusion as to the best procedure to be adopted in different cases.

It is only of late years that surgeons have undertaken to remove any considerable portion of the tongue, and some have been surprised to find how free from danger the operation is, and how speedily and distinctly their patients speak after having lost a great part of that organ. The late Mr. Fairlie Clarke, in his work on diseases of the tongue, collected some interesting cases, in which the tongue was cut out as a punishment or had been otherwise lost. He says: "In A.D. 484, about sixty Christian confessors, of Tipasa, a mountain colony on the north coast of Africa, had their tongues cut out by order of Huzmeric, the Vandal conqueror; but within a short time some at least of them were able to speak with such distinctness that it was accounted a miracle, and it was supposed to be a signal mark of Divine favour that men who had been deprived of their tongues could still go about preaching. Even Newman, in his 'Essay on Miracles,' maintained this view: 'We find that in the Middle Ages it was no unusual thing to condemn persons who had made an unwelcome use of their speech to have their tongues cut out. The Bishop of Caithness was treated thus in A.D. 1201 for venturing to intercede with Harold for the lives of some prisoners. Again, the Ordinances of Louis IX of France condemned perjurers and blasphemers to have their tongues burnt with a red-hot iron; while Languis, of Lemberg, records that, in Germany, Italy, and Spain, similar culprits were punished by having the tip of the tongue cut off, the first step in the execution of the sentence being to nail the offending member to a tree. The case of Pope Leo III, which is narrated by Milman, is another instance of a somewhat similar mutilation, the recovery from which came in process of time to be reckoned a miracle. I am also indebted to Mr. Twisleton for having drawn my attention to the account of some French Protestants who, in the middle of the seventeenth century, were condemned to have their tongues cut out before they were led to the stake. One of them, immediately after the operation, repeated three times, "Le nom de Dieu soit béni." In another instance the martyrs spoke so distinctly that the executioner was accused of not having carried out the sentence.'" Mr. Clarke narrates other instances of the same description, but the above are enough for the purpose of showing with what little danger the removal of the tongue is attended even when practised in the rough and ready manner by the executioner; also how little the speech is really affected by its removal.

The first case I can find of removal of the tongue by surgeons was as early as the year 1658, but it was not until the commencement of the present century, viz., 1805, that the operation was performed in any definite form, when Inglis attempted to strangulate the diseased part by means of a ligature passed round it, the ligature being kept in position by means of pins, which were made to transfer the tongue behind the disease. In 1827 Major split the tongue down the centre, and applied a ligature around the diseased half with the same object. In 1831 Jaeger suggested and practised dividing the cheek, with the view of getting more room and enabling him to get well behind the disease. In 1833 Morault introduced the preliminary ligature of the lingual artery. In 1836 Roux first introduced the division of the lower jaw and lip in the middle line. This method was afterwards adopted by Sédillot in 1844 and Syme in 1862. Then, in 1865, Langenbeck divided the lower jaw opposite the first molar tooth in order to gain free access to the side of the mouth for the removal of the tongue glands and part of the palatal arch and tonsil. In 1838 Regnoli opened the floor of the mouth from below by an incision from the middle of the hyoid bone to the chin, ending in another semilunar incision along the border of the jaw, the tongue being drawn down through the opening and removed. Billroth modified this operation in 1871 by extending the lateral incision and uniting the central one in the middle line. In 1854 Chassaignac suggested the écraseur passing the chain through an incision above the hyoid bone, and in this year also the galvanic écraseur was used by Middledorf. In 1866 Nunnelly first adopted Chassaignac's method in this country.

In 1877 Mr. Whitehead, of Manchester, first removed the tongue by means of the scissors, tying the lingual artery as he divided it; at the same time, perfectly independently, Billroth suggested removal of the tongue by the same method, but first ligatured the lingual artery by the ordinary operation.

In 1880 Kocker adopted a method of opening the mouth from behind and below the angle of the jaw to reach the base of the tongue and remove with it the tonsil, soft palate, or any other parts that may be affected. This operation has the further advantage, that by the external incision all glands that may be affected can be removed.

Morrant Baker has lately reintroduced the plan of splitting the tongue, removing either half with the écraseur. He also places a ligature around the portion last in the loop, as he finds the lingual artery is always to be found there.

Mr. A. E. Barker, in extensive operations, suggests that tracheotomy, or laryngotomy, should always be performed before the removal, and Trendelenburg's tracheotomy tampon canula be used. He afterwards plugs the pharynx with a large sponge, with a string attached, to prevent any blood getting either into the stomach or larynx. He thinks by this method there is less risk of septic pneumonia following the operation.

In all ordinary operations the back of the mouth can be easily plugged with sponges without tracheotomy being performed.

To Chassaignac we owe the introduction of the écraseur, and it was not until this instrument was brought to the notice of the profession that surgeons dared to remove the tongue through the mouth without an external wound. It is to the relative merits of removing the tongue by this method, as compared to removal by scissors, that I wish now to draw your attention.

The operations most in vogue for removal of the tongue at present may be divided into three groups, viz., by the wire, or chain, or galvanic écraseur, either by unilateral or bilateral ablation, *i.e.*, by the knife or scissors ; and, lastly, those cases in which, from the extent of the disease, more extensive operations are required, such as Syme's, Regnoli's, or Kocker's.

To arrive at some kind of conclusion as to the best method to adopt in excision of the tongue, I have collected from the medical journals all the cases I can find reported for several years. I have also communicated with Messrs. Barwell and Gant, who advocate the use of the écraseur, with Mr. A. E. Barker, who advocates the performance of tracheotomy in many cases before removal, and with Mr. Whitehead, who was the introducer in this country of the use of the scissors. I have also collected and examined the records of the cases that have been operated on at the Cancer Hospital during the last two or three years.

The results of my investigation are not so satisfactory as I could wish, but still much may be gathered from them.

For instance, we read in one paper an account of the difficulties and dangers one operator experienced in removing the tongue by the Whitehead method. In the following week another surgeon states he has never seen any dangerous hæmorrhage arise during the operation performed in this way.

Then, again, one surgeon contends that the écraseur, either wire or galvanic, leaves a lacerated, sloughy wound, which exposes the patient to much greater risk of septic poisoning than if the organ had been removed by incision.

Professor Stokes, in his paper read at the Clinical Society in 1881, alluded to the cases operated on by Drs. Schäpher and Collis. The former surgeon, in 31 cases in which he removed the tongue by the écraseur, had only 3 deaths from septic causes, showing a percentage of only 6 per cent. of deaths; whereas, in 10 cases in which he removed the tongue by incision, he had 6 deaths from septic complication, or at the rate of 60 per cent. Dr. Collis had very similar results, as in 20 cases in which he removed the organ by the écraseur he had no deaths; whereas, in 13 cases in which he removed it by scissors, he had 8 deaths, or at the rate of 61 per cent. Mr. Barwell has furnished me with the results of his 14 cases removed by the écraseur, in which he lost none. Mr. Gant, 10 cases removed by the buccal operation and écraseur, with no deaths.

On the other hand, Billroth's experience seems to have differed considerably from that of the above-named surgeons, as he has nearly abandoned the use of the écraseur, and adopted the method of removing the tongue with scissors, ligaturing the lingual arteries first.

Mr. Whitehead has, in answer to my inquiries, furnished me with the results of his operations. He has removed the entire tongue 58 times, viz., 48 times by scissors and 10 by the galvanic écraseur. Of the 48 cases of the removal by scissors he lost 9, or at the rate of 18·7 per cent.; but he explains this apparently high mortality by the fact that he frequently operated upon very advanced and hopeless cases, at the request of the patients themselves, solely with a view to remove from the mouth a loathsome mass of disease, and with a prospect of lessening pain. He attributes the deaths of these 9 cases practically to septic poisoning.

COMPARISON of Cases removed by the Écraseur and Incision, showing the relative Mortality from the two Operations.

	Dr. Schäpher.		Dr. Collis.		Mr. Barwell.	Mr. Gant.	Mr. Whitehead.		Dr. Purcell.	Collected by the Author.		Total.	
	Écraseur.	Incision.	Écraseur.	Incision.	Écraseur.	Écraseur.	Galvanic écraseur.	Incision.	Incision.	Écraseur.	Incision.	Écraseur.	Incision.
Total number	31	10	20	13	14	10	9	48	6	21	13	105	90
Died	3	6	....	8	....	....	....	9	1	6	4	9	28
Death-rate	9	60	....	61	....	....	....	18·7	16·6	28·5	30·7	8·56	31·1

From the above Tables it will be seen that, while there were only 9 deaths after removal of the tongue in 105 cases, or at the rate of only 8·56 per cent., after removal of the organ by incision death occurred in 28 cases out of 90 operated upon, or at the rate of 31·1 per cent. One cause for the excessive mortality after removal of the tongue by the scissors may be, I think, traced to the fact, that in many cases the operation has been adopted simply as a palliative measure, and to relieve the patient of a filthy putrid mass from his mouth.

The conclusions to be drawn from the above observations are—

1. In all cases of small nodules or ulcers seen early, that do not speedily improve or disappear by treatment, should be excised as soon and as freely as possible. The best plan of doing this is undoubtedly by means of the knife or curved scissors, taking care to cut well into the healthy tissue. Should any hæmorrhage occur the cautery will usually stop it.

2. The écraseur is applicable to the class of cases in which the disease is limited to some portion of the anterior part of the tongue; and here I unhesitatingly would adopt Mr. Morrant Baker's operation of splitting the tongue down the middle and removing the diseased half by the écraseur, adopting his precaution of placing a ligature around the last part included in the wire. Should both sides be affected, I should still split the tongue and remove each part separately, as by this means you can remove the parts much further back.

3. When the tongue substance is thoroughly infiltrated with the disease extending far back, it becomes a question whether the scissors or écraseur should be used. If the latter, the plan proposed and practised by Mr. Barwell is, in my opinion, the one by which the best results may be expected, as by it undoubtedly the wire can be placed thoroughly well behind at the root of the tongue. The buccal operation also gives much more room for the application of the wire well around the

disease. But the length of time occupied in the removal, and the almost impossibility of guiding the wire so as to embrace the whole of the disease, in these cases of extensive disease, appears to me the great drawback to this plan of treatment. Messrs. Whitehead and Billroth's operations have, in this class of cases, very decided advantages, as they enable the surgeon to keep as clear of the disease as possible, and if care is taken to snip very slowly and keep the mouth well wiped out with dry sponges there is very little risk of hæmorrhage. Care should be taken when approaching the lingual arteries to be ready to seize them with clamp forceps and tie them at once.

I have seen as much, if not more, hæmorrhage during the use of the écraseur as I have during the removal by scissors. I have, however, on one or two occasions seen most violent hæmorrhage during the removal by scissors, and I found it impossible to secure the lingual at the bleeding point, and was obliged to tie the artery by external incision; another case at which I was assisting a year ago the same thing occurred, and the patient's life was in serious danger. Mr. Treves also relates a case in the "Lancet," in which he had the greatest difficulty in arresting the hæmorrhage. Under these circumstances, therefore, when the disease extends at all within the floor of the mouth, it would be always wise to adopt Billroth's method, and preface the operation by ligaturing the lingual arteries. The surgeon would then be very much more at his ease, and better able to snip away the whole of the disease. He can, by the same incision by which he ties the arteries, also remove any glands that may be affected.

Mr. Christopher Heath has done much to relieve the operator of anxiety by his excellent suggestion of drawing the stump of the tongue well forward by an assistant working his finger round the base of the tongue and pressing it well forward. By this means all hæmorrhage may be arrested until the bleeding point is secured. I have witnessed the excellent results of this method of controlling hæmorrhage, especially when the tongue has been removed by the Whitehead method with the scissors.

A case that occurred in my practice strongly supports what Mr. Treves has met with in his experience of removing the tongue by the scissors. It was the case of a strong, powerful man, who had a fair-sized epithelial ulcer on the left side of his tongue, extending somewhat into the floor of the mouth. The man was placed in a sitting position before a good light, and the tongue split down the centre and snipped away with the scissors and quickly removed; violent hæmorrhage ensued, and the bleeding point was most difficult to find, as the tissues were all so pliable and rotten that a ligature could not hold, and I was eventually, after many futile efforts to arrest the hæmorrhage, obliged to ligature the lingual artery by external incision. The man lost a very large quantity of blood, and died a few days afterwards from septic pneumonia. I would strongly recommend in all such cases as these that the lingual artery shonld be tied first, or the operation which I am about to describe adopted.

I have practised in some cases, when the disease is not too extensive, a combination of Morrant Baker and Kocker's operations. My reason for adopting this plan is that I consider it most important that all glands, be they ever so slightly enlarged, should be removed. By making then a large external incision, as recommended by Kocker, the surgeon is enabled to enucleate all glands that come into view. Then, if the disease of the tongue is not very extensive, instead of following Kocker's operation further I remove the diseased half of the tongue by the écraseur after the plan laid down by Mr. Morrant Baker. By this means I remove all glands and the diseased portion of the tongue without opening the floor of the mouth, which I think is very important to avoid if possible. Should the disease be more extensive, and there should be some difficulty in removing the diseased portion of the tongue by the écraseur, I should extend my external operation and tie the lingual arteries, and afterwards remove the tongue with scissors. A case illustrative of the advantages of this operation came under my care some short time ago.

Case.—A man, ætat 45, presented himself with an ulcer on the right side of his tongue the size of a shilling; the tissues of the organ anent were deeply infiltrated, and the disease extended rather far back, about in a line with the foramen cæcum. The glands in the neck were extensively diseased. I made in this case a long incision, extending from just above the angle of the jaw to nearly the middle line or point. I had no difficulty in removing all the glands. The floor of the mouth being quite free, I determined to split the tongue down the middle and remove the diseased half by means of the wire écraseur, which was done without difficulty. The wound in the neck and the floor of the mouth speedily healed, and in a comparatively short time he left the hospital.

The surgeons who advocate the removal of the tongue by the scissors claim for this method the following advantages, viz., rapidity of removal, greater precision in removing all the affected parts, and a lesser risk of septic mischief after the operations. The first two points I think they have clearly established, but I cannot find any proof of this operation having been more free from septic mischief than those cases in which the organ has been removed by the écraseur.

Their claim to rapidity and precision in removal I consider are two most important points, and points which must have great weight with most, if not all, surgeons in deciding upon the course they should adopt in any given case. If the patient is low and emaciated, is it wise to keep him for so long a time under an anæsthetic, as is requisite to remove the organ by the écraseur? The advocates of this method no doubt will answer at once, "Yes!" And for this reason: that by this method no blood need be lost. Granted, but I contend by means of removal by the scissors very little blood need be lost if care is taken to snip very slowly and take up the lingual artery directly it is divided, and at the same time, you can be very much more sure of removing the whole of the disease.

It is impossible, or well-nigh impossible, in a tongue that is thoroughly infiltrated, to guide the wire of the écraseur, by whatever method may be adopted, so as to be sure that the whole, or as much as is possible to be removed, is removed. Moreover, if Billroth's method is adopted, the whole of the diseased portion may be snipped away without any fear of hæmorrhage.

Mr. Barker, in a very able paper read before the Pathological Society, advocated very strongly the advisability of performing tracheotomy in all cases where the whole of the tongue has to be removed in such cases as I am at present discussing. In this, however, I differ with him. I think it is subjecting the patient to an extra operation without an adequate compensation in any way for the extra expenditure of strength and vital power.

If, as I have earlier suggested, the tube with sponge connected be introduced into the pharynx, or well to the back of the tongue, there is little fear of any blood trickling into the larynx during the operation; and if the floor of the mouth is treated, as he has advised, by plugging it with gauze soaked in spirit and well dusted with iodoform, I cannot see that there is very much risk of septic poisoning afterwards.

Should the disease extend not only into the tongue substance, but also infiltrate the floor of the mouth deeply, then if an operation is to do any good at all it must be done as thoroughly as possible. In such cases, undoubtedly, the operation of splitting the jaw in the middle, as first suggested by Roux and Sédillot in 1836 and 1844, but perfected by Syme in 1862, or Langenbeck's operation, of dividing the jaw at the first molar tooth, are the best—in fact, the only ones that give any hope of clearing the disease from the mouth.

4. Where the disease implicates the whole of the floor of

the mouth, and the gums, the tonsils, and the submaxillary glands are affected, then the only operations which can be expected to remove the disease are either Sédillot's, Regnoli's, or Kocker's, and in some cases, when the disease has not extended to the cervical glands, either one or the other of these operations may be performed. Here, again, much discussion has arisen as to the best method of removing the diseased parts after they are separated from the jaw and drawn down through the opening. For myself I think it matters very little; undoubtedly with the scissors the surgeon is better able to remove the disease more thoroughly, but in all these cases it is well-nigh impossible to remove it all. I should prefer the scissors, as the parts can be much more quickly removed, and any bleeding parts are then easily taken up and secured.

A man was admitted into the Cancer Hospital with a hard mass of disease quite at the back of the tongue, extending into the floor of the mouth and implicating the pillar of the fauces, tonsils, and pharynx; he had many enlarged cervical glands. He suffered intense pain, and had much difficulty in swallowing. After a consultation with my colleagues it was decided to endeavour to remove the disease by Kocker's operation. The disease extended so near the external carotid and internal maxillary arteries that it was deemed advisable in the first place to ligature the common carotid, which was done by extending the upper incision downwards, along the anterior border of the sterno-mastoid. On removing some of the glands the superior thyroid and facial veins were found to be enormously dilated, and it was necessary to divide them. On putting a ligature on to the proximal end the tissues gave way, and it being so close to the internal jugular vein, it was deemed unsafe to leave a ligature so near to such a large and important artery, so I decided upon placing a ligature around it above and below and dividing it. Having cleared away all the glands and snipped out the diseased tissues as far as I could find them, I opened the floor of the mouth, and having split the tongue down the centre as far back as the epiglottis, proceeded to snip out with scissors the floor of the mouth, half of the tongue, tonsil, pillars of the fauces on the same side, and a portion of the pharynx. The wound was thoroughly drained with two large tubes, and the patient fed from the time of the operation by means of a gum elastic catheter and funnel. His temperature kept very high for some days, but he eventually made a thoroughly good recovery, and six months after the operation there was no return of the disease.

Lastly, in those classes of cases which present themselves in which the disease has progressed so far as to render any operative procedure for the removal of the organ impracticable and useless. Can we do nothing to mitigate the sufferings of the patient? I think much may be done for him by adopting the method by the late Mr. Charles Moore and also by Mr. Hilton. They suggested the division of the lingual nerve where it lies behind the last molar tooth and immediately beneath the mucosa, and in some cases ligatured the lingual arteries. There is no doubt in cases where excessive pain and profuse salivation are among the most prominent symptoms, section of the nerve may be practised with great benefit to the patient. I think it advisable, if possible, to remove a piece of the nerve, as this would prevent any possibility of its reunion. The division of the nerve not only gives instant relief to the intense pain experienced by the patient, but it also gives him great comfort by preventing the secretion of saliva.

Operations.—The operations proposed have for their object, then—

First, to relieve the suffering of the patient or to retard the growth of the disease. For the former, Mr. Hilton, some time ago, suggested the division of the gustatory nerve, and for the latter, the lingual artery may be ligatured.

Secondly, extirpation of the disease, with a view to a radical cure and prolonging life. For this, as has been shown, numerous operations have been proposed. As they all have for their object the same end, I shall only describe those operations which are now most commonly practised, viz.: (1) removal of the organ by means of the scissors, as suggested by Whitehead and Billroth; (2) removal by the écraseur, either galvanic or wire; (3) Sédillot's or Syme's procedure of splitting the lower jaw in the middle line; (4) Kocker's operation of removing the tongue and floor of the mouth by an incision made below the angle of the jaw; and, lastly, Regnoli's submental operation.

Palliative Operations.—Division of the gustatory nerve was introduced by Hilton, with a view of alleviating the suffering caused by cancer. Mr. Moore adopted this method in several cases with marked comfort to the patient on whom he operated. The division of this nerve has a further recommendation, as it decreased the flow of saliva, which is always a great source of annoyance to patients suffering from cancerous disease of the tongue.

The nerve may be divided in two ways, but the simplest method is to remember that the nerve lies under the mucous membrane of the floor of the mouth, just opposite the second molar tooth. Here it can be most easily divided by dividing the mucous membrane in this situation covering it, when the nerve will be found lying just behind the sublingual gland. It should be raised on a blunt hook and a quarter of an inch of the nerve removed. In cases where the disease extends to the floor of the mouth it is sometimes difficult to find the nerve in this situation, in which case the positions suggested and practised by Moore are to be preferred. He took as his guide a line drawn from the centre of the crown of the last molar tooth to the angle of the jaw; this line will cross the nerve at the exact spot where it should be divided. The nerve lies about half-an-inch from the tooth, between it and the anterior pillar of the fauces, parallel to but behind and below the bulging alveolar ridge, which can be felt in the jaw ascending towards the coronoid process. By entering the point of the knife, therefore, into the mucous membrane three-quarters of an inch behind and below the last molar tooth, and cutting down to the bone, the nerve must be divided. Moore advised that a curved bistoury should be used for this purpose, to avoid the projecting alveolar ridge.

The relief experienced by the patient is instantaneous, the pain suddenly disappearing along the whole of the parts supplied by the nerve.

Ligature of the lingual artery has been proposed with a view of arresting the progress of the disease by cutting off the blood supply to the parts. I have never seen any good result from this operation, and therefore cannot recommend its adoption for this purpose.

It is well, however, in removing the tongue, often to ligature the artery as a preliminary measure, as it enables the surgeon to take his time in removing the tongue in extensive disease of the organ.

The artery is best reached by a curved incision extending from the symphysis menti, reaching downwards as low as the hyoid bone, and prolonged upwards nearly to the angle of the jaw. The skin, cellular tissues, and platysma being divided, and all bleeding points clamped as the dissection proceeds, the flap is drawn up by an assistant. The central tendon of the digastric muscle and the submaxillary gland are now exposed; the latter should be drawn upwards, and the tendon of the digastric downwards, by blunt hooks. The posterior edge of the mylo-hyoides should be defined, and the hypoglossal nerve, with a branch of the lingual vein, will be seen passing beneath its posterior border, lying horizontally upon the hyo-glossus muscle. These structures being drawn up out of the way, the surgeon proceeds to divide a few fibres of the hyo-glossus transversely about an eighth of an inch above the great corner of the hyoid bone, when the artery will be at once exposed. An aneurism needle, armed with silk or catgut, should be passed round it from above downwards, and the artery secured.

Operations for complete or partial Extirpation of the Tongue.

The operations suggested by Whitehead and Billroth are identically the same, with the exception that Billroth first secures the lingual arteries as above described.

Whitehead's operation is conducted after the following simple manner:—

1. The mouth is opened to the full extent with Mason's or any other suitable gag, the duty of attending to this important part of the operation being intrusted to one of the two assistants required.

2. The tongue is drawn out of the mouth by a double ligature passed through its substance an inch from the tip. This ligature is given in charge of the second assistant, with instructions to maintain throughout the operation a steady traction outwards and upwards.

3. The operator commences by dividing all the attachments of the tongue to the jaw and to the pillars of the fauces, after the manner suggested by Sir James Paget, with an ordinary pair of straight scissors.

4. The muscles attached to the base of the tongue are then cut across by a series of successive short snips of the scissors until the entire tongue is separated on the plane of the inferior border of the lower jaw, and as far back as the safety of the epiglottis will permit.

5. The lingual or any other arteries requiring torsion are twisted or ligatured as divided. It is generally found that a moment's pressure with a small piece of sponge, held in sponge forceps, suffices temporarily, if not permanently, to arrest any bleeding; it is, however, regarded as desirable to twist or

ligature, either immediately, or after the tongue is removed, every bleeding vessel.

6. A single loop of silk is passed by a long needle through the remains of the glosso-epiglotiddean fold of mucous membrane, as a means of drawing forward the floor of the mouth should secondary hæmorrhage take place. This ligature may with safety be removed the day after the operation, and, as it is invariably a source of annoyance to the patient, it is always desirable to adopt this rule.

The after-treatment should be such as I shall describe later on.

Mr. Barwell, at the Clinical Society, in March 1881, showed a patient in whom he had adopted the method of excising the tongue by the écraseur. The description of the operation, as suggested by him, is the following:—

An incision, about one-third of an inch long, just in front of the hyoid bone, exposed the raphé of the mylo-hyoid, which, being divided, bared the edge of the genio-hyo-glossus; these muscles, separated with the handle of the scalpel, enabled the operator to feel the base of the tongue and the deep surface of the buccal mucous membrane. A Liston's needle passed into the wound entered the mouth just behind the left last molar tooth, the thread being left. The same was done on the right side, the loop of the cord being in the mouth. To the first cord the end of an écraseur wire (to be described immediately) was tied, and so drawn into the mouth; its end, being freed from the first thread, was hooked into the loop of the second, and drawn round the back of the tongue, out of the wound, and fastened to the écraseur. A Liston's needle was then passed into the wound through the middle of the tongue, and, guided by the operator's finger, was made to emerge well behind the disease. This needle guided the wire as it was tightened along the required line. As soon as the back of the tongue was thus severed, another écraseur was placed behind the incisor teeth, and its loop pressed well down in the previous section. Thus the tongue was freed from the floor of the mouth, and taken out from between the lips.

Mr. Barwell said of his method that, if the écraseur were slowly used, it was almost bloodless, left no mutilation, and that he could remove the tongue from immediately in front of the epiglottis with as much ease as the tip. Moreover, as the sensory nerves of the organ were divided close to the jaw, the patient suffers hardly any pain afterwards, as exemplified by this case.

Dr. Purcell has adopted a somewhat similar method to this at the Cancer Hospital, but, instead of using the wire écraseur, he has adopted the galvanic wire. I have removed the tongue by this method with good results, and consider, where the disease is seated quite at the base of the organ, and implicating more or less the whole of its substance and encroaching on to the floor of the mouth, that this is the best method to adopt.

Mr. Morrant Baker's Operation.—By this method, after the introduction of a suitable gag and the removal of any sharp or jagged teeth which might be in the way of the operator, two threads are passed through the tongue about an inch behind the tip and half-an-inch on each side of the middle line. The tongue being now drawn forwards and upwards, the frænum and, as far as it may seem necessary, some of the muscular attachments of the tongue to the lower jaw in front are now snipped through with strong, rather curved, blunt-pointed scissors, and the scissors are then "run" along the floor of the mouth at the side, beneath the mucous membrane, as far back as may seem requisite, keeping close to the lower jaw, both for the avoidance of hæmorrhage and for the sake of being clear of the disease. The operator now with his forefinger clears the tongue in front and at the sides, and, drawing it well forward again and giving one thread to his assistant while he holds the other himself, he cuts steadily along the middle line of the tongue from the tip backwards, and farthest along the mucous membrane. On the withdrawal of the knife the finger is now again introduced, and it will be found quite easy to complete with it the median division of the tongue by a little tearing or splitting between the two halves. The only part which cannot be thus torn is the mucous membrane of the dorsum. Hence the advice just given to divide this with the knife as far as may seem necessary for getting beyond the level of the disease. The écraseur is now slipped over the diseased half of the tongue; the assistant turning the screw while the operator keeps the loop as far behind the disease as possible. This is, of course, one of the most important parts of the operation; any want of care at this stage being shown afterwards by the narrow margin of healthy tissue, or by none at all, left attached to the diseased mass. The insertion of curved needles behind the disease, in order to insure the division by the écraseur of healthy tissue, is often advisable, but, for the reasons previously given, must not be considered a sufficient safeguard in the absence of free separation of the tongue's attachments in front and at the sides.

The écraseur employed should be one curved "on the flat," and a strand of twisted wire or strong whipcord will be found more serviceable than the linked chain, which, from working only in one plane, or nearly so, is much less readily looped far back.

In all cases in which, from the extent of the disease backward, or in the floor of the mouth, any difficulty is anticipated in placing the loop of the écraseur well beyond the tumour, the cheek may be divided with advantage by an incision extending from the front border of the masseter to the angle of the mouth. This measure, indeed, though not uncommon, is, I am inclined to believe, much less frequently adopted than it might be, especially in cases in which the cancerous affection has invaded the floor of the mouth.

If combined with division of the frænum, and as much of the muscular structures which tether the tongue in front as may be safely divided, and if, at the same time, the mucous membrane of the floor of the mouth be cut through, so as to form a sound boundary-line for division in this direction, I have found that division of the tongue along its middle line is an excellent preliminary measure, not only in operations for removal of half the tongue, but of the whole organ also. The two halves are more completely under control than the tongue as a whole, and by working with two écraseurs simultaneously no time will be lost.

It sometimes happens, and especially when wire or whipcord is used instead of the jointed chain, that the portion of the tongue which has been noosed is not completely severed, even when the écraseur has been screwed up to the hilt; and this is much more likely to happen when the part of the tongue which is being divided is healthy than when the loop has been placed only just beyond, or not beyond, the diseased tissue. In the latter case, the comparatively hard and brittle cancerous structure is easily crushed through; while, on the other hand, the soft and yielding healthy tissue is partly crushed through and partly squeezed up into a fine pedicle, which is pulled through the aperture at the end of the écraseur through which the cord works. The matter may be, of course, remedied when too great a length of wire has been allowed, by reversing the screw and retying the chain or cord; but a better plan in many cases is simply to put a ligature round the pedicle beyond the loop of the écraseur, and cut off the severed half of the tongue forthwith—a simple procedure, which saves many minutes and affords the operator the satisfaction of knowing that he probably has the principal vessel ligatured, instead of lying merely crushed on the face of the stump. In the same way, too, the time occupied in the tightening of the écraseur-loop may be often advantageously shortened, a ligature being applied so soon as the tongue-tissue has been squeezed up (of course slowly) to the dimensions of a small pedicle.

Excision of the tongue by division of the lower jaw, or Sédillot's operation, consists of dividing the lower lip in the middle line by a vertical incision extending from the lip across the chin to the hyoid bone; the jaw is then sawn through at the symphysis. Sédillot recommended that, instead of sawing through the bone in a straight line, two oblique cuts should be made, meeting in the centre, thus >, so as to form a triangle, and allow the opposite sides of the bone being locked more firmly together after removal of the tongue. This is not, however, at all necessary; but it is well, before dividing the bone, to drill two holes on each side of the median line directly opposite to each other, so that on bringing the bone together the wire may approximate the ends quite evenly.

The jaw having been sawn through, the surgeon proceeds with scissors to snip the mucous membrane and muscles connecting it with the tongue, keeping the scissors quite close to the jaw, the two sides of which are drawn apart; the tongue is then removed from the hyoid bone by a stroke of the knife. The lingual arteries and all other bleeding points must be secured by clamp forceps and ligatured. The removal of the tongue from its base may, however, be accomplished with less loss of blood by using the wire or galvanic écraseur; in fact, by this method scarcely a drop of blood need be lost.

A stout silk or whipcord ligature should be passed through the stump, brought out of the mouth, and fastened to the forehead of the patient by means of a piece of sticking-plaister, for the double object of preventing the stump from falling back and causing dyspnœa, also of affording a means of drawing the stump forward in case of any secondary hæmorrhage.

The opposite sides of the jaw must now be brought together, and fixed by means of stout silver wire, and the lower lip united with hare-lip pins in the usual way, a few interrupted horsehair or wire sutures being placed in the wound below the jaw. The after-treatment must be the same as recommended for the other operations.

Kocker's Operation.—In this operation Kocker performs preliminary tracheotomy, and introduces Trendelenburg's canula, which is most convenient for the administration of the anæsthetic. He then passes a large sponge, soaked in a weak solution of carbolic acid, well into the pharynx, with a strong piece of silk or whipcord attached; by this means all risk of blood trickling into the larynx or being swallowed is avoided. A long curved incision is then made, extending from the symphysis menti to the hyoid bone in front, and continued from thence to a point about the centre of the sterno-mastoid muscle, and upwards along the anterior edge of that muscle to a point a little below the tip of the ear; the flap thus formed is turned up on to the cheek, and the facial and lingual vessels secured. The deep tissues being now divided to the full extent of the wound, and all bleeding stopped and vessels ligatured, the submaxillary fossa is completely cleaned out, and the lymphatic, submaxillary, and sublingual glands removed before the floor of the mouth is opened. The chief hæmorrhage in this part of the dissection will be caused by the division of the facial artery and vein, and the anterior and external jugular veins; by careful dissection, however, these may be always seen before dividing them, and ligatured in two places, dividing the vessels between the two points. The next step is to place a gag in the mouth, and with scissors divide the mucous membrane and tissues in the floor of the mouth, having first passed a stout ligature through the tip of the tongue. Care will have to be taken, unless both lingual arteries are tied in the preliminary stage, to catch the vessel on the side opposite to the incision, when divided, and ligature it at once. The floor of the mouth being now opened, the surgeon passes the silk ligature through the opening in the floor of the mouth, and draws the tongue into the wound beneath the jaw, pulling it through the opening; he then proceeds to remove either the part or the whole by the scissors, galvano-cautery, or wire écraseur.

This being done, and all bleeding points secured, any enlarged glands must be removed. In ordinary cases the wound may be brought together by a few wire sutures and intervening horsehair sutures. A large drainage-tube should be inserted into the most dependent part of the wound, and the whole dusted with iodoform powder.

If the operation is extensive, Kocker prefers to leave the wound open. He directs that the tracheotomy canula should be left in as usual after tracheotomy. In order that the wound shall not be infiltrated with the discharges, the skin flaps are fixed back with sutures, and the entire cavity from the entrance of the wound right back to the mouth and pharynx is plugged with a tampoon of sponge or gauze well soaked in a five per cent. solution of carbolic acid. But before this strong solution is applied to the wound, the tampoon should be washed over with water.

The patient is to be fed chiefly when the dressings are changed, but he may also be fed by the rectum. The whole operation and dressings are done under the spray.

Regnoli's operation of removing the tongue through the floor of the mouth is performed by making a vertical incision from the symphysis menti to the hyoid bone, and from the distal end of this incision carrying two other curved incisions on either side of it, running along the border of the inferior maxilla to the anterior edge of the masseter muscle, so as to avoid wounding the facial vessels; the skin, cellular tissue, and platysma are then to be dissected back so as to expose the lingual muscles. The insertion of the genio-hyoid and genio-hyo-glossal muscles and the mucous membrane of the floor of the mouth are next divided, a bistoury being passed then into the mouth; the anterior insertion of the digastric and mylo-hyoides muscles and mucous membrane are divided as far as the anterior pillars of the fauces, and all bleeding points secured. The tip of the tongue is then drawn down through the wound so that it lies on the front of the neck, and the organ removed either by the scissors or the écraseur.

A modification of this is the operation originally suggested by Chassaignac and Nunnelly, and modified again later, as already described, by Barwell and Purcell.

In some cases in which the floor of the mouth is affected well in front, extending into the substance of the jaw, necessitating the removal of a portion of that bone, the operation suggested by Sédillot and Syme is necessary, and a portion of the jaw may be removed by the same operation. Case VIII, referred to in the Appendix, is such a case, in which the symphysis was entirely removed, as well as the floor of the mouth and tongue.

Removal of Lymphatic Glands.—If, as usually happens, the lymphatic glands are affected, it is well to excise them at the time of removing the disease in the tongue. They may usually be easily enucleated by an incision made directly over the enlarged glands. Often, however, the tissues in the neighbourhood are infiltrated, and thickened by chronic inflammation extending around the diseased gland, and frequently the sheaths of the vessels are implicated, in which case it is well-nigh impossible to remove them without injury to the vessels and nerves. In such cases it would be far wiser not to attempt the operation.

The removal of small ulcers or warty growths, if seen early, may be accomplished by seizing the growth with a pair of Vulsellum or artery forceps, and snipping them out with scissors, care being taken to cut deeply into healthy tissue.

In all operations for the removal of the tongue or portions of the tongue, the mouth should be well gagged open with a suitable gag, and undoubtedly the one best adapted for the purpose is that suggested by Whitehead and named after him.

Death after removal of the tongue is most frequently caused by septic pneumonia, the result of absorption of septic matter derived from the wound, or from hæmorrhage during the operation, the blood getting into the bronchi and setting up irritation there.

Secondary hæmorrhage is a not uncommon cause of death, but may follow the removal of the tongue by the écraseur or incision. If care, however, is taken at the time of the operation to secure all the vessels, I do not think secondary hæmorrhage need be much dreaded. Should such an occurrence take place, the surgeon should clear the clot out and search for the bleeding point and secure it by a ligature. If, however, as sometimes is the case, this is impossible, a pellet of iron lint may be applied, and pressure maintained; should the hæmorrhage still continue, it will be wiser at once to ligature the lingual or carotid artery.

The Treatment of the Wound after Operation.—It was not until quite recently that surgeons troubled much about the treatment of the wounded surface after the removal of the tongue; they contented themselves by keeping the wound well syringed out several times a-day with some antiseptic fluid—chlorate or permanganate of potash, or weak solution of carbolic acid—and feeding the patient with nutritive enemata for a few days after the operation, so as to keep the mouth as clean as possible.

German surgeons have of late, however, paid great attention to this point, and it is to Woelfler, Kocker, and Billroth we owe much for drawing attention to the subject. The method of dressing the wound adopted by Billroth in his clinic, as suggested by Woelfler, is as follows:—He takes 6 metres of gauze, thoroughly cleansed of all fatty matter, and soaks them in a mixture of glycerine and colophony dissolved in alcohol (60 gr. glycerine and 100 gr. colophony dissolved in 1,200 gr. 94 per cent. of alcohol); then squeezed and powdered in the half-dry state, with about 50 gr. of iodoform powder.

From this strips are cut about the width of two or three fingers, and are placed in the cavity in the mouth with a pair of forceps; all the angles of the wound are filled with it without exercising any undue pressure, but so as to cover the whole surface of the wound.

The gauze thus introduced interlaces with the surface of the wound, and forms a firm dressing which cannot be displaced without producing hæmorrhage. This dressing may remain for six or eight days without being removed, at the end of which time granulation will have commenced, the plug becomes loosened, and can then easily be taken out. The advantage claimed for this form of dressing is that the patient may be fed by the mouth in the usual way the day after the operation, without fear of irritating the wound in any way; and the drainage which is usually necessary can be dispensed with.

I have adopted this method in two or three cases in which I have removed the tongue, and must confess I have not found it come up to my expectations.

The treatment I adopt is, after all hæmorrhage is arrested, to thoroughly dust the wounded surface over with iodoform; if an opening has been made in the floor of the mouth—that is, if Kocker's operation has been performed, or the tongue has been removed by the écraseur through an opening in the floor of the mouth—I invariably utilize this for free drainage with a full-sized drainage tube. The cavity of the mouth is syringed out twice or thrice a-day with a solution of Condy's fluid, and then the whole surface again dusted over with iodoform.

The patient is fed from the first with the œsophageal catheter with funnel; this is easily passed by the nurse, and without pain or inconvenience to the patient. By this means the patient's strength is well maintained; and I have, since I adopted this plan of treatment, had excellent results from my operations, as also have my colleagues, who now nearly always adopt this plan of treatment.

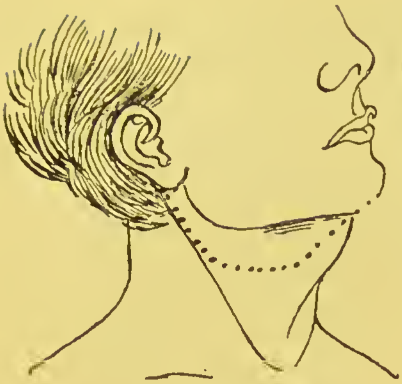

Fig. VIII.

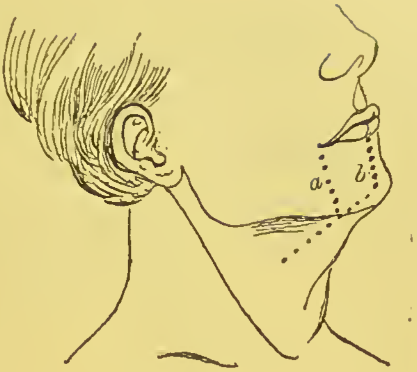

Fig. IX.

Fig. VIII.—The dotted line represents the incision to be made in Kocker's operation for the removal of the tongue.

Fig. IX.—The dotted line (*a*) represents the incision in Langenbeck's method of section of the jaw opposite the first molar tooth.

The dotted line (*b*) represents the incision for removal of the tongue, after section of the jaw in the middle line, as adopted in Roux's, Sédillot's, and Syme's method.

TABLE of Cases collected from the Medical Journals,

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
1	Jane A., 47, F.	None	Growth on right side of tongue commenced April 1873; one year previous to admission noticed first a small nodule, size of a pea; at present of considerable size, but smooth and condylomatous in appearance. Constitutional remedies tried, and irritating stumps of teeth removed. Extended from one inch from the tip backwards to within a quarter of an inch of base. In front approaches to within a quarter of an inch of middle line
2	J. H., 52, M., labourer	None	Front of tongue and extensive infiltration of sublingual tissues
3	E. S., 61, F.	None	Tumour, size of small chestnut, and tolerably firm, situated behind the middle of the right edge of tongue, not encroaching upon either dorsum or under surface. The surface has a granular appearance, and the growth overhangs the contiguous surface of tongue. No glandular enlargement. First noticed a small pimple on right side of tongue six months ago
4	J. D., 62, M.....	None	Sore on right side of tongue about one inch long and three-quarters of an inch wide. Tissue around hard and indurated. About a year ago noticed a pimple at side of tongue; commenced to ulcerate ten weeks ago. No pain; does not smoke; no bad teeth

Reports of Societies, and the Cancer Hospital Case Books.

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
None	The tongue was removed by splitting it down the middle line, and the diseased half excised close to its attachments to the hyoid bone. The patient was fed by means of a gum-elastic feeding tube passed by the nostril and allowed to remain	Was quite well one year after the operation	....	1
None	Divided lip and skin down to the hyoid bone in the middle line, sawing through jaw on each side of symphysis, and removing the tongue and subjacent soft parts with galvanic écraseur	Made a good recovery. Jaw firmly united	....	2
None	Removed by wire écraseur	Made a good recovery	....	3
None	Removed by wire écraseur	Made a good recovery	....	4

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
5	J. S., 55, M., labourer	None	Sore on floor of mouth, which extended forwards as far as symphysis of jaw. The parts were hard and fixed. The front teeth were bad and irregular, and more or less loose. On left side large glandular swelling in submaxillary region, the size of a pigeon's egg. About six months ago noticed soreness of floor of the mouth. At first no hardness, but after two or three months noticed a lump, which increased in size, and then his lower teeth became loose. Has been a great smoker ; short clay pipe
6	T. H., 66, M., policeman	None	On right side of tongue is an ulcerated mass about half-an-inch long, raised somewhat above the surface of tongue, and nearly filling the mouth. The tissues around are hard, extending to left side. Severe pain ; no hæmorrhage ; unable to swallow solids. Seven weeks before noticed increased flow of saliva and pain in tongue, accompanied by swelling on left side. A week later it became hard and grew rapidly, and three weeks ago it commenced to ulcerate. No smoker ; no syphilis ; toothless
7	A. B., 49, M.....	None	Ulcer situated on one side of tongue ; no glandular enlargement. Smoker
8	F. J., 55, M., labourer	None	Large ulcer on side of tongue, implicating the floor of mouth. First noticed a pimple on side of tongue nine months ago, which ulcerated about six months later. Submaxillary land enlarged ; teeth jagged

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
None	Lip divided to hyoid bone. Jaw cut through on each side of symphysis by chain saw ; the glands were dissected out by extending the incision, and the tongue removed by wire écraseur	Made a good recovery	....	5
None	The frænum and deep tissues in floor of the mouth were divided with scissors, also the anterior pillars of fauces. A vertical incision, three-quarters of an inch long, was made in the median line just above the hyoid bone, and the loop of a wire écraseur passed into mouth and slipped over back of tongue close to epiglottis, and the tongue thus removed	Made a good recovery	....	6
None	Tongue slit down middle, and disease removed by wire écraseur	Made a good recovery	....	7
None	Removed by Syme's operation	....	Died of septic pneumonia a fortnight after operation	8

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
9	E. P., 74, M., sailor	None	Large ulcer, very similar to last case. The ulcer has been coming for the last ten months. Great smoker; short clay pipe
10	J. S., 58, M.	None	Ulcer on under surface of tongue, encroaching on frænum and floor of mouth. First noticed it eighteen months ago, when it was cauterized. Glands enlarged
11	W. E., 49, M	None	Large ulcer implicated the whole of one side of tongue and floor of mouth. Has been coming on for the last twelve months
12	E. L., 26, M.....	None	Ulcer implicating top of tongue and floor of mouth. First noticed soreness seven months since
13	E. S., 37, F.	None	Ulcer deep on left side of tongue raised, and tissues around hard; increased rapidly to level of last molar tooth. No glandular enlargement. First noticed a fissure in tongue three years ago
14	W. B., 64, M....	None	Large ulcer, about one inch behind the top of tongue, situated on the upper surface; tissue around hard. Base of ulcer deeply excavated, and covered with greyish slough. Glands enlarged. No great smoker
15	D. C., 45, M.....	None	Extensive ulceration of whole tongue, and enlargement of glands at the angle of jaw. Very bad teeth

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
None	Removed by Syme's operation, tracheotomy being performed as a preliminary, and Trendelenburg's tampons and tubes used	....	Died of septic pneumonia	9
None	Removed by Syme's operation	....	Died of septic pneumonia	10
None	Removed by Syme's operation. Tracheotomy performed. Mouth drained with silver tube	Made a good recovery	....	11
None	Removed by Syme's operation. Tracheotomy performed. Mouth drained with silver tube	Made a good recovery	....	12
None	The tongue was split down the middle, and the diseased half removed by wire écraseur	....	Died with diphtheritic exudation in trachea and bronchi	13
None	Tongue split down the centre, and diseased half removed by wire écraseur	Recovered	....	14
None	Tongue split down centre, and diseased half removed by wire écraseur	....	Died of septic pneumonia, third day	15

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
16	G. D., 64, M., clerk	None	Ulcer on right side of tongue, extending along the whole side of tongue. Induration passes far back, but does not extend much into the floor of the mouth. No glandular enlargement. Commenced as a small lump six months previously. Attributes it to rough, jagged teeth
17	G. S., 44, M.....	None	Recurrence of disease in right side of tongue. The disease had been removed nearly four years previously. The disease recurred in the scar
18	N. W., 50, M.	None	Large ulcerated mass extending along right side of tongue. Glands at angle of jaw enlarged. First noticed a pimple eight months previously
19	E. D., 56, M.....	None	A foul ulcer, involving left side of tongue and floor of mouth, and extending to lower jaw. No glandular enlargement. First noticed a sore place below tongue three months ago on left side; this has gradually increased in size
20	T. P., 45, M., butcher	None	Large ulcer extending along the left border of tongue from near the tip to the last molar tooth. Edges raised and everted. Glands in submaxillary region much enlarged. First noticed small sore on left side of tongue six months ago, which has increased very rapidly
21	J. H., 52, M., shoemaker	None	An irregularly oval, cancerous ulcer, with raised edges and hardened base, is situated about the middle of left edge of tongue. A small gland beneath jaw on left side. Noticed a sore spot on left side of tongue about ten weeks ago, which has gradually increased in size

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
....	Tongue split down centre, and diseased half removed by wire écraseur	Made a good recovery	....	16
None	The whole tongue removed in two halves with scissors	Recovered, but glandular enlargement took place shortly after operation	....	17
None	Whole tongue and glands removed	Made a good recovery. Nine months afterwards glands in neck became affected	....	18
None	Removed the whole tongue. The left cheek was divided from the angle of mouth to the masseter muscle. The tongue was split and removed by écraseur	Made a good recovery	....	19
None	The tongue was split, and removed by wire écraseur	Made a good recovery	....	20
None	Whole tongue removed in two halves. When the tongue had been almost crushed through by the écraseur, a ligature was placed around	Made a good recovery	....	21

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
21			
22	J. A., 60, M.....	....	Ulcer on side of tongue, which extended rapidly as far back as the foramen cæcum, involving whole organ. Had a small lump seven months ago, which had been twice removed by ligature
23	J. S., 58, M.	....	Ulcer of large size, which bleeds freely, situated on left side of tongue. Attributes it to jagged teeth. Has been a great smoker. Noticed first as a small sore eighteen months ago
24	J. B., 69, M.....	....	Ulcer situated at centre of right side of tongue. Noticed it first eleven months ago
25	B. D., 40, F.	....	Large excavated ulcer on tongue, the size of date, with hardened edges, bleeding on slightest touch. No glands. First noticed blister on tongue eighteen months ago; about two months since observed a spot on left side
26	G. W., 50, M.	....	Large ulcer, surrounded by deep infiltration, occupying the right half of tongue. Glands. Noticed a brownish spot on tongue about nine months previously. No bad teeth. Smoker
27	E. H., 34, M.	....	The tongue ulcerated over the right side for greater part of extent, with hardened base. There is also a hardened nodule on left side of tongue. Nodule first noticed on right side of tongue three months before admission
28	A. B., 61, M.....	None	Extensive ulceration of tongue. No glandular enlargement. Five years ago burnt his tongue with a hot clay pipe

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
	the remainder to secure the lingual artery			21
....	Removed by écraseur through small opening above hyoid bone, as recommended by Barwell	Made a good recovery	...	22
....	Tongue removed by écraseur after dividing the cheek, as recommended by Gant	Made a good recovery	....	23
....	Removed by wire écraseur through submental opening	Made a good recovery	....	24
....	The mucous membrane of floor of mouth freely divided round lower jaw with scissors, and tongue removed by passing the wire of the écraseur round	Recovered. The disease returned in a year	Died one year after operation	25
....	The same operation as the previous case	Recovered. Disease recurred in five months	....	26
....	Cheek divided to masseter muscle, and tongue removed by écraseur	Recovered	....	27
None	Frænum, floor of mouth, and anterior pillars of fauces divided with Paquelin's cautery, and tongue removed with écraseur	....	Died of septic pneumonia ten days after	28

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
29	J. M., 59, M.....	None	Ulceration of tongue, extending to floor of mouth. First noticed an ulcer six months previously
30	T. H., 56, M.....	Grandfather died of cancer of jaw	Ulcer occupying right middle third of tongue, ulceration with deep induration. First felt lump on tongue five months ago. Attributed to bad teeth and smoking short clay pipe
31	M. K., 50, M.	....	Deep, dirty fissure on left side of tongue; commenced as a crack about six months previously. Bad teeth; great smoker; hard drinker
32	A. B., 53, M.....	....	Large ulcerated mass on left side of tongue, implicating the floor of the mouth. Glands much affected. First noticed five months previously
33	G. D., 42, M.....	....	Indurated fœtid ulceration, occupying greater part of the floor of the mouth on left side, extending back as far as last molar tooth; on right side to lesser extent, closely adherent to inner surface of jaw and surface of tongue. First noticed five months previously. Ascribed to a pipe with dirty brass mouthpiece
34	J. T., 44, M.....	....	Ulceration of right margin of tongue, as far back as the palatal glossal fold. Foul ulcer, an inch and a half long. Due to jagged teeth. Enlarged glands
35	W. P., 48, M....	....	Ulcer involving nearly the whole tongue, worse on left side. Commenced as an indurated spot on left side of tongue several months previously. No local cause

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
None	Frænum, &c., divided with scissors, and tongue excised with wire écraseur. Lingual artery bled freely	....	Died of septicæmia seven days after operation	29
None	Whole tongue removed with scissors (Whitehead)	Recovered well....	....	30
None	Whole tongue removed with scissors (Whitehead). Severe hæmorrhage, difficult to control	....	Died of pyæmia on sixth day	31
None	Whole tongue removed with scissors (Whitehead). Hæmorrhage difficult to control	Made a good recovery	....	32
None	Lower lip and jaw divided as in Syme's operation, and the soft parts cut away with scissors; the tongue and soft parts being removed by wire écraseur; the stump secured with ligature	Recovered well....	....	33
None	Half of tongue removed by scissors (Whitehead). Hæmorrhage	....	Died septic pneumonia on third day	34
None	Removed with scissors (Whitehead operation)	Recovered well....	....	35

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
36	C. F., 49, M.....	....	A long valley-shaped ulcerated fissure, occupying the middle and posterior third on left side; also numerous patches of ichthyosis. Glands enlarged. Caused by a pipe being broken in the mouth twenty-eight years previously. Had always been sore off and on since
37	G. F., 57, M.....	....	Ulcer about one inch and a half long, chiefly in middle of tongue; bleeds freely. Glands affected. Sore first noticed twenty years previously
38	F. J., 53, M.....	....	Ulcer involving whole centre of tongue. Commenced two months ago
39	E. G., 45, M.....	....	Ulceration very extensive on left side of tongue. First noticed four months previously
40	B. A., 58, M.....	....	Right half of tongue and floor of mouth extensively ulcerated; posterior limits could not be distinguished
41	F. B., 56, M.....	....	Dorsum of tongue extensively affected. No glands. First noticed sore four months
42	W. H., 45, M., grocer	....	Ulceration extended on right side of tongue as far back as the epiglottis. Floor of mouth implicated. Glands enlarged. Has had extensive hæmorrhage
43	A. R., 49, M....	None	Ulcer extending along left edge of tongue, extending on to dorsum, about size of a shilling. No glandular enlargement. Teeth very foul. First noticed some ulceration on left side six months previously

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
Yes	Removed with scissors (Whitehead's operation)	Recovered	....	36
None	Removed with scissors, as above	Recovered	....	37
None	Removed with scissors (Billroth's operation). The lingual ligatured as a preliminary step	Recovered	....	38
None	Removed with scissors (Billroth's operation)	Recovered	....	39
....	Removed with scissors (Billroth's operation)	Recovered	....	40
None	Removed with scissors (Billroth's operation)	....	Died of pneumonia on sixth day	41
None	Disease too far advanced to admit of being removed. The carotid ligatured for the hæmorrhage	....	Patient improved after operation, and died fifth month later of exhaustion	42
None	Tongue removed by galvanic écraseur	Recovered	....	43

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
44	S. N., 48, M. ...	None	Cicatricial-looking nodule on left side of tongue, extending to tip, and about size of small bean. No glandular enlargement. Had had small blisters on tongue for several years
45	T. S., 67, M.	None	Ulcer, size of a shilling, on left side of tongue, jagged edges, and hard, indurated base. Fifteen months ago cut his tongue with a jagged instrument ; wound never healed properly
46	J. D., 59, M.	None	Deep irregular ulcer along right side and tip of tongue. Submaxillary glands much enlarged on right side. First noticed a small ulcer on right side of tongue eight weeks ago
47	W. C., 50, M....	None	Ulcer, with hard indurated edges, on tip of tongue, extending back along the left margin for about one inch and a half. No enlarged glands. Two months ago cut his tongue against a sharp tooth. Caustic was applied
48	J. C., 43, M....	None	Small ulcer on right edge, and hardness of adjoining tissues ; some soreness about angle of mouth. Nine months ago first noticed tongue sore. Submaxillary glands since become affected. Smoker
49	W. G., 53, M.	None	Large ulcer eating into tongue, extending to the base of the organ. Two enlarged glands. First noticed, eight months ago, ulcer on left side, caused by jagged tooth. Smoker
50	A. K., 73, M.....	None	Ulcer on left side of tongue, which commenced five years ago with a warty growth

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
None	Tongue removed with knife. Troublesome hæmorrhage. Left lingual had to be ligatured	Recovered	....	44
None	Left half of tongue removed with curved scissors	Recovered	....	45
None	Tongue removed with scissors. Free hæmorrhage from linguals; controlled by ligatures	Recovered	....	46
None	Tongue removed with scissors	Recovered ...	....	47
None	Tongue split down the middle, and half tongue removed with scissors	Recovered	....	48
None	Half tongue removed with scissors. Extensive hæmorrhage	Recovered from operation, but disease had returned	....	49
None	Tongue removed with knife. Very troublesome hæmorrhage. Actual cautery applied	Recovered	....	50

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
51	W. B., 32, M.	None	Deep ulcer, size of a threepenny piece, on right side of tongue. Commenced three weeks ago with small hard nodule. Hard smoker
52	M. S., 57, M....	None	A vascular growth, readily bleeding, about the size of a large walnut, on the right side of tongue; floor of mouth indurated. No enlarged glands. Commenced two years ago as a wart under right side
53	J. P., 57, M.....	None	Ulcer implicating the whole tongue, and extending to floor of mouth. No glands. Commenced as a small ulcer on tip of tongue
54	G. R., 55, M.....	None	Tongue irregularly eaten away, chiefly at tip and left side. The dorsum is also covered with white ichthyostic fur. No enlarged glands. First noticed, six months ago, a small spot on left edge of tongue, which has continued to increase. Great smoker

Ichthyosis present.	Date and Character of the Operation	Result.	Date and Cause of Death.	No.
None	Tongue removed with scissors	Recovered. Disease returned in tongue and glands of neck five months after	....	51
None	Half tongue removed by galvanic écraseur. Hæmorrhage considerable, and difficult to stop	Recovered. Secondary hæmorrhage took place, and the carotid was tied	....	52
None	Half tongue removed, and Paquelin cautery applied freely to floor of mouth	Recovered	....	53
Yes	Tongue removed with Galvanic écraseur	Recovered	....	54

CHAPTER V.

CANCER OF THE TONSIL.

Malignant growths of the tonsil as a primary disease are comparatively rare; indeed, Mr. Butlin in his search has only succeeded in finding twelve cases; nine of these were round-celled sarcomata; one spheroidal-celled, and two squamous-celled carcinomata. Of these twelve cases, three only are recorded by English surgeons, viz., two cases of round-celled sarcomata in the Pathological Society's Transactions, vols. xxiv and xxix, and one in St. Bartholomew's Hospital Report, 1877.

Lately, however, two cases have come under my observation; and Mr. A. Barker tells me he has had three cases recently under his charge; and Mr. Marcus Beck removed a sarcomatous growth from the tonsil of an elderly female a short time since; and at a recent discussion at the Clinical Society several cases were mentioned; so that I am inclined to think the disease is not so uncommon as is generally supposed; indeed, from the structure of the tonsil, one might well understand that it should be a favourite seat for sarcomata.

Of the three forms of malignant disease found in the tonsil, spheroidal-celled epithelioma is the least commonly met with; they have their origin in the glands situated in the submucous tissue.

Sarcomata are always met with as distinct prominent tumours of the round-celled variety, always encapsuled, and easily shelling out when operated upon. They grow most rapidly, and if allowed to go on their course unchecked speedily assume a large size. The sympathetic glands in the neck are affected, in nearly every instance, very early in the disease, often appearing within a few weeks of the commencement of the attack.

This form of disease may attack people of any age; thus, in the cases of Mr. Butlin, the ages varied from 17 to 53; in Mr. Barker's they were all elderly; and in two cases that have come under my own observation one was 23 and the other 55 years of age.

Carcinomata, as the sarcomata, commence in the form of distinct tumours when occurring as a primary growth; they, however, very quickly break down into a deep foul ulcer, which spreads rapidly, infiltrating the surrounding tissues. The lymphatic glands in the neck are early affected, and speedily suppurate. These growths are chiefly met with in old people, and are very vascular, patients often dying quite suddenly from hæmorrhage.

Dissemination in sarcomatous disease of this part is, I believe, extremely common; in all the cases recorded, where examinations were made after death, tumours were found in different organs of the body.

Sarcomata are readily removed; and perhaps the best method to adopt is the following: the mouth being fixed open with a gag, and the tongue and buccal mucous membrane protected with bone spatulæ, the tissues over the tumour are to be divided by means of Paquelin's red-hot knife down to the tumour; then, with the finger or the handle of a scalpel, the growth is readily enucleated. By removing the disease in this way there is little or no hæmorrhage, and the disagreeable choking that would accompany the removal by means of the knife, from the blood trickling into the trachea, is avoided. In some cases the galvano-cautery wire may be placed round the disease, which is then removed. When the tumour is very large, and a tedious operation anticipated, it is well to perform preliminary tracheotomy, and passing a sponge attached to a string into the pharynx; in this case the removal may be accomplished either with the thermo-cautery or scalpel.

Carcinoma as a secondary growth is most common, the disease extending from the tongue, palate, or œsophagus; when occurring in this form it is perfectly hopeless to attempt its removal by any operative procedure. The treatment can be only palliative, mouth washes of antiseptic lotion, boro-glyceride, Condy's fluid, &c. In cases where pain is the predominating symptom, morphia or other sedatives must be administered freely.

The diet must be soft and nutritious, as any hard substances are swallowed with the utmost difficulty, and cause infinite suffering. Should the disease extend so as to threaten to close the passage, œsophagotomy or gastrostomy should be performed to save the patient the misery of dying from starvation.

In a case recently under the care of my colleague Mr. Hayward, much relief was given by performing gastrostomy and tracheotomy; although in this case life probably was not prolonged; yet the condition of the patient was much improved, and she died in comparative comfort.

CHAPTER VI.

CANCER OF PHARYNX AND ŒSOPHAGUS.

EPITHELIOMA and scirrhus are practically the only forms of malignant disease that are met with in the œsophagus; as, although a few isolated cases of sarcoma and colloid cancer have been recorded, they are so few as almost to be unworthy of notice.

One case of sarcoma is quoted by Mr. Butlin. It is reported by Dr. Chapman in the "American Journal of Medical Sciences," vol. cxlviii, p. 433. I cannot do better than quote the abstract of the case as I find it reported:—*

"A Mr. M——, æt. 45, died some eight or nine months after the first appearance of symptoms indicative of stricture of the œsophagus. They had not differed in any way, so far as was observed, from those attending any form of malignant stricture; but after death the walls of the inlet of the canal were greatly thickened, and perforated at one point by a small orifice which led into the interior of an oval tumour lying to the right side of the œsophagus, and having generally an alveolar build. Whether this was an enlarged gland does not seem to have been certain, but below it, and still to the right side of the œsophagus, lay another tumour, of whose glandular origin no doubt was entertained. Microscopical examination of the walls of the œsophagus where they were thickest showed that the epithelial layer was wanting, that the corium was transformed into a tissue partly of round and partly spindle cells, and that the submucous layer was composed of a dense mass of spindle cells forming alveoli filled with large oval cells. The glands had a similar structure."

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* Butlin: "Sarcoma and Carcinoma," p. 160.

This case, so far as I am able to discover, stands by itself, as I have not been able to find another case reported since.

The form of cancer found in the œsophagus is usually of the squamous-celled variety of epithelioma, occasionally the cylindrical form, and, rarely, scirrhus. Thus, in 59 cases collected by Mr. Butlin, 54 are classed as squamous-celled epithelioma, 4 as spheroidal-celled (hard and soft), and 1 colloid. In the 60 cases collected by myself, 46 were attributed to epithelioma and 10 to scirrhus. It will thus be seen that, in 115 cases, 14 were attributed to scirrhus cancer, or 12·3 per cent., while the remaining 87·7 per cent. were of the epitheliomatous type.

Men here, as in epithelioma of the tongue, are much more frequently attacked than women; thus, in the 59 cases referred to by Mr. Butlin, 47 were men, while only 12 were women. So, likewise, in the cases collected by myself, there were 13 women affected in the 60 cases collected.

The situation of the disease in the cases collected by me is not very definitely mentioned; but, so far as I could ascertain, the upper third of the tract was attacked in 12 cases, the middle in 23, and the lower in 12; in two cases the seat was not mentioned. This does not agree with the experience of other observers; and no doubt the reason is to be found not so much in reality, but in the manner cases are reported. Thus, in many of my own cases, the seat of disease has not been definitely fixed as occurring in either third, but has usually been described in connection with the anatomical relation to adjoining parts; so that no doubt many cases which I have classified as occurring in the middle third may really have involved a portion of the upper and middle in some cases, and in others the middle and lower thirds.

Dr. Norman Moore, in 12 cases he collected, found the disease situated in 6 cases in the lower end, in the middle in 5.

Morrell Mackenzie contends that the upper third was the seat of disease in nearly half his cases; while Ziemssen, on the contrary, thinks the lower half is more frequently affected.

Then, again, the disease is often found to extend over such a large extent of the tract that it is very difficult, if not impossible, to determine the exact spot at which it commenced.

Thus, if the canal were divided into halves instead of thirds, I agree with Mr. Butlin the number of cases affecting each half would in all probability be very nearly equal.

In only 6 of the 60 cases was ulceration absent. The character of the ulceration is similar to that found elsewhere; the edges jagged and irregular, usually everted, the surface presenting a gnawed, uneven appearance, and coated with flocculent discharge. The surrounding parts are indurated, and often, if not always, infiltrated with the disease. In 16 cases the glands in posterior mediastinum were affected and impregnated with the disease.

As the growth progresses it spreads rapidly, ulcerating into neighbouring parts. Thus, in the 60 cases referred to, the thoracic aorta was perforated in 6, the patients dying quite suddenly from hæmorrhage.

The trachea was eaten into in only two cases, although undoubtedly it is more frequently attacked than this would lead one to suppose. The lungs, bronchi, and pericardium were also invaded by the disease in several cases, as will be seen by referring to the Table. The bronchial glands, I believe, are very much more frequently affected than is generally supposed; but dissemination into other organs is rarely met with. Dr. Norman Moore found the lungs the seat of secondary deposit in four cases out of twelve, and ulceration into the large vessels in two.

Age plays an important part in the diagnosis. The average age of the cases here reported is 49·24 years; sixteen were over 60, and twenty-two between 50 and 60, while there is not one under 30. If, then, a patient complains of the symptoms to be presently described, any or all of them, and he is over 50 years of age, you may fairly suspect malignant disease; and if there be no history of the sufferer having swallowed any corrosive liquid, or having had syphilitic ulceration, you may be quite sure he is suffering from cancer.

Among the diseases that may be mistaken for carcinomatous disease of the œsophagus are spasmodic strictures, and simple strictures, following chronic inflammation, leading to hypertrophy and induration of the walls of the tube; or from contraction occurring in cicatrization of an ulcerated surface, the result of old burns, caused by swallowing boiling liquids, or some corrosive compounds, either strong acids or caustic alkalies. The former is usually met with in young hysterical women, is of sudden appearance, and is usually traced to mental causes or adjacent irritation, and is always accompanied by nervous and hysterical symptoms. This form can be easily distinguished by the passage of an œsophageal tube, the patient being placed under the influence of an anæsthetic. The latter forms of stricture are often much more difficult to diagnose, and in these cases not infrequently the recurrent laryngeal nerves become involved in the disease, causing aphonia, due to paralysis of the vocal chords. In these cases most distressing symptoms, followed by speedy death, may result, owing to foreign substances getting into the trachea and air passages, dependent upon the inability of closing the glottis.

Origin.—The manner in which the disease commences is said to be by the formation of plaques, nodules, ulcers, or fissures, as in other parts. Zenker and Ziemssen, who have written upon this point, say the disease commences sometimes in an island-shaped plaque, and sometimes in the form of a girdle; but the facilities for determining the true method are so few, that I think we can only judge of the manner of origin by analogy, and I should be inclined to favour the idea that the disease commenced much in the same manner as we see it do in the tongue, lip, or mucous membrane of the mouth. Our opportunities of studying this point, as well as which surface of the canal is most frequently affected, are necessarily limited to the post-mortem room; and, as has before been observed, the disease progresses so rapidly, and spreads over so large an extent of the tract, that it is impossible to decide where it commenced in a very large majority of the cases.

Duration.—The length of time a patient may live when affected with this disease must necessarily depend upon a variety of circumstances. Thus, the average length of life of forty-nine cases in which the duration of the disease is mentioned, so far as one is able to determine, was only a trifle over eight months, from the time when the patient first complained of any pain, discomfort, or difficulty in swallowing; but this, quite possibly, is much under the mark of the real time, as there can be no doubt that many patients have the commencement of the disease present without any symptoms arising to cause them to notice discomfort or pain. The causes that would affect the length of life after the disease is established are many and manifold. For instance, when the growth ulcerates into the aorta or any large blood-vessel, life will be cut very suddenly short; so, likewise, if the disease extend into the bronchi or the lungs, death will be considerably accelerated. Should the pneugastric or recurrent-laryngeal nerves be involved, then again dissolution will be hastened. The longest time a patient was known to live after the disease was recognized, in the Tables reported by me, was fifteen months, while in Mr. Butlin's cases sixteen months was the extreme period noticed. The earliest death mentioned in my list is three months. In this case, as also in another which lived only four months, the cause of death is attributed to hæmorrhage from ulceration into the aorta.

The majority of cases, if left alone, no doubt die from exhaustion due to inanition and continued pain. In twenty-three of my cases gastrostomy was performed, with marked benefit so far as pain was concerned, in most, if not in all, the cases operated upon. Whether life was actually prolonged by the operation I think is open to doubt, and will form a subject for consideration when discussing the treatment of the disease.

Predisposing Causes of the disease are difficult to assign, but here, I think, we may fairly judge by analogy of other parts; and I have very little doubt that the habit of taking very hot substances or pungent sauces, such as chilies, mustard, &c., in large quantities, may, by constant irritation in a subject predisposed to the disease, form a class of causes which may excite the disease. So, again, old cicatrices, either from burns or syphilitic ulceration, may constitute a very likely starting-point for malignant growths.

Dissemination.—Secondary deposits do not commonly form in distant organs of the body when the disease is situated in the œsophagus. Thus, the liver was the seat of cancerous deposit in only two, the left pyramid of the thyroid body in one, the lungs in four, the spleen in one, the heart in one, and the stomach in two, out of my sixty cases; while, in Mr. Butlin's fifty-nine, the liver was affected in three cases, the kidneys in two, the pancreas and stomach in one. In most of these cases, where dissemination of the disease takes place in distant organs, I think the primary disease is nearly always scirrhus. Thus, in the two cases in which secondary deposits were found in the liver as recorded above by me, the original growth was reported as being scirrhus cancer.

The bronchial and neighbouring glands are noticed as being affected in only ten cases; but I cannot help thinking that they are the seat of secondary disease in a far larger proportion of cases than this, as we know how very rarely the glands are found to be unaffected in cancer of the tongue, lips, breast, or, indeed, any other part, and it is scarcely conceivable they should escape here. In Mr. Butlin's cases they were found to be diseased in fifteen cases. The glands usually affected are those lying in the immediate neighbourhood of the disease; yet sometimes it happens, as pointed out by Gussenbauer, that those glands lying at a distance almost remote from the disease are first and solely attacked.

That dissemination of the disease is a rare occurrence, then, I think there can be no doubt; but often one finds a number of nodules in the mucous and submucous tissues of the œsophagus, sometimes above and sometimes below the original disease, often invading the whole of the œsophageal tract even as high as the tongue, which have been found by microscopical examination to be epitheliomatous. It has been suggested that these secondary growths are carried as germs by means of the blood and lymphatic vessels situated in the walls of the œsophagus; but Mr. Butlin not being aware of any lymphatic vessels disposed thus longitudinally along the œsophagus, and considering the evidence not sufficient to support this theory of transmission through the blood-vessels, and further, he not being in favour of their being separate growths of the primary disease, says: "It seems more probable that they are the result of continuous extension of the primary disease beneath the mucous membrane, not in a thin and widely extended layer, but rather in the form of fine ends or lines which here and there break forth in more exuberant growth." Now, I am very much more disposed to favour the theory of the extension of the disease by means of the blood-vessels, not by the means suggested of germs being carried along the tract, but, as the more recent research of Schüppel and Feltz, who have shown reason for believing that cancer cells may penetrate directly into the capillary vessels either by perforation of the capillary wall, or, following Cohnheim and Maas, by the actual migration of the cancer cells; this latter mode, as Nepveu argues, though difficult to prove or refute, is most probable. In another theory, published some years ago by Legros, the statement is made that the vascular epithelia in cases of cancer of the breast were much larger than normal. Since 1872 Nepveu has made many observations to the same effect, and further, he has noticed proliferation of the epithelia lining the small veins and capillaries in apparently healthy tissues situated at some distance from the morbid focus. As to the frequency with which this occurs, Nepveu states that he has no certain data. He names this form of dissemination "*endophlebitis cancerosa.*" I think this method of the disease being disseminated along the œsophagus is the most probable, and one that recommends itself to my mind far before that suggested of its extension beneath the mucous membrane. To account for the extension of the growth through the lungs, it certainly is not difficult to understand that the disease having ulcerated into one of the bronchi or trachea, the cancer cells are easily conveyed by the simple act of inspiration deeply into the lung substance to the air-cells, and I think the fact that often only one lung is affected, frequently at only one spot, and that most commonly in the right lung, favours this view.

Symptoms.—The symptoms of all forms of malignant disease of the œsophagus are pretty much the same, excepting, perhaps, that scirrhus cancer is of slower growth than squamous epithelial cancer, but for all purposes of diagnosis and treatment they are practically identical.

Formation of cancerous matter in this region is commonly preceded by pyrosis, hiccough, and transient pains in the fauces. Suddenly developed dysphagia is, however, frequently the first sign of its existence. Undoubtedly, many patients have malignant disease developed some time before any symptom occurs, and constantly the first intimation is the fact that one day they find they cannot swallow a piece of solid food without difficulty, and often it is returned. They more frequently for some little time have a burning sensation when the food passes down the œsophagus, and the passage of any solid is accompanied with pain. Symptoms from this time succeed quickly, and shortly the patient finds he can swallow nothing but liquids. In some cases the œsophagus forms a tumour from dilatation of the canal above the disease, which fills with the food and forms a tumour perceptible externally, and this has actually been mistaken for an enlarged thyroid gland.

Paralysis of the vocal chords, either singly or both, is a most frequent symptom of malignant disease of the œsophagus, and when coupled with the other symptoms is most conclusive as to the true character of the case, as it is scarcely ever present in other forms of stricture.

If the stricture affect the upper part of the canal, the greater portion of each mouthful of food at once regurgitates; if the lower, then a few mouthfuls pass easily as far as the stricture, and the accumulated matter is then gently expelled by the action of the muscular fibres. These occurrences are at first only occasional, a circumstance which tends in some cases to keep alive the hope that the patient is suffering from spasmodic stricture only. But the dysphagia eventually becomes permanent; it may be attended in addition with spasmodic contraction of the pharynx, accompanied by great dyspnœa and cough; should the disease open into the trachea or a bronchus, violent coughing and threatened suffocation will often attend every act of swallowing food. Sometimes a dilated pouch forms above the obstruction; here the food may accumulate and is rejected, commonly with the greatest effort, sometimes without either pain or effort.

The ingesta accumulated in the œsophageal pouch are never perhaps wholly rejected. The patient is even sometimes conscious of the slow filtration of some portion of them through the constricted part into the stomach.

I am inclined to think that the cases of stricture of the œsophagus other than traumatic or malignant are of very rare occurrence.

Polypus of the œsophagus may give rise to many of the symptoms of stricture; thus, in a case related by Dr. James, "British Medical Journal," vol. ii, 1878, p. 832, he relates a case where a patient, a lady, suffered from a polypus which entirely precluded her from taking food; this, like one related in the same volume by Mr. Annandale, was easily relieved; the one case by puncturing the tumour, which evacuated a quantity of gluey mucus, and in the other by removal of the polyp. In both these cases the tumour was seen by the patient, and the chance of mistaking them for stricture was very slight.

Diagnosis.—One very important aid to diagnosis, both as to the nature of the stricture, whether organic or spasmodic, is to be found in auscultation. In a very valuable paper read at the meeting of the British Medical Association in 1875, Mackenzie pointed out how necessary it was in all cases of dysphagia to examine the œsophageal tract by means of the stethoscope.

That this method is not commonly practised is proved, I think, by the fact that I do not know any text-book in medicine or surgery that describes it as a means of diagnosis.

The plan adopted varies in different cases, and it would be well for any one who wishes to adopt it, to practise in the first place upon a known healthy individual. The patient having taken a mouthful of water, the operator places the stethoscope first upon the trachea anywhere between the hyoid bone and the supraclavicular fossa. The patient then is told to swallow, when a very distinct resonant gurgle is heard at the part where the stethoscope is placed. The sound, which is very loud at the hyoid bone, becomes duller and more distant the further the stethoscope is placed from that bone.

To examine the lower part of the œsophagus, the stethoscope must be removed to the spine and carried down the left side of the spines of the first eight dorsal vertebræ. Here the sound is still more distant, though very distinct, and is like a smooth body slipping through with a sort of cluck.

To ascertain the length of time it takes for a morsel to travel the whole length of the canal, the operator should place the instrument over the cardiac orifice, and his finger upon the larynx; thus the moment the act of deglutition commences is known by the rise of the larynx, and its completion by the ear. The rate of swallow varies with different individuals, weakly persons being slower than the more robust.

In cases of dilated œsophagus, the fluid may pass the tube quickly enough, but the absence of energy is recognized by the want of grasp. The fluid passes down the tube with a squirting or running sound, not as though slung in a piece. It must be remembered, however, that in obstruction at the cardiac end the accumulation of mucus may, and often does, modify or prevent the usual sounds for some five or six inches above the seat of disease.

In tender places Hamburger says the morsel may be heard to stick or recoil. The tone of the swallow is changed in quality by the presence of rough ulcers and the like on the inner surface of the tube, so that it becomes deadened, though the more common and more easily observed result is the obstruction to the morsel in its passage; indeed, it is this prolongation of the passage of the food through the canal that is most diagnostic and easily recognized. So that in all cases where this is noticed you may be sure there is some diminution of the calibre of the canal interfering with its peristaltic action.

If the stricture be very tight, the morsel, when it reaches the spot, eddies through with a creak or even with a squeak, and should it be tighter still, we hear a resonant regurgitation of the food. It will be easily understood how valuable this means of diagnosis is, as in spasmodic contraction dysphagia is unknown to the stethoscope.

Of the use of the œsophagoscope as a means of diagnosis I have no experience, but I have little doubt in some hands it may be a useful aid, although I think for all practical purposes it is unnecessary.

The passage of an œsophageal tube is an important aid to diagnosis, as by this means you are enabled to discover the exact site of the disease; also, if the stricture be merely spasmodic or hysterical, the patient being anæsthetized, the instrument will pass easily into the stomach.

Several good specimens of cancer of the œsophagus are to be found in our Museums. In University College Museum the following are among the most interesting, the description of which I refer you to.

"1041. Portion of a pharynx and œsophagus, with the larynx and adjoining parts. In the posterior wall of the upper part of the œsophagus, immediately below the cricoid cartilage, a flattened tumour has grown. The growth extends over about an inch and a-half of the length of the œsophagus, within which it projects so as to cause considerable narrowing; the tumour is about one-third of an inch in thickness; the mucous membrane has been removed from its right side by ulceration. The divided surface of the growth has an open reticular texture, of which the meshes contain a softer homogeneous substance. The morbid growth is not distinctly limited at either its upper or lower borders; it is called in the MS. catalogue 'scirrhus,' but its nature is doubtful.

"From a man, æt. 68, whose general health had been good, and habits temperate. About seven months before death he felt pain near the hyoid bone in swallowing, and since that time had experienced constant pain in the right side of the head. Dysphagia supervened; and for some time before death fluids could be swallowed only with the greatest difficulty. One of the cervical glands on the left side commenced to swell soon after deglutition was impaired. After death, when water was poured into the pharynx, it did not pass the constricted part, but would do so in the reverse direction. On the right side the wall of the œsophagus was found to be connected with the posterior part of the cricoid cartilage. The œsophagus was contracted and its walls atrophied.

"There was no secondary growth in the viscera."

"1037. A tongue with the larynx, part of the pharynx and œsophagus, &c. The mucous membrane of the highest part of the œsophagus and lower part of the pharynx, as far as the upper border of the cricoid cartilage, is superficially ulcerated and has a somewhat recticular surface. At the lower limit of this surface the œsophagus is greatly narrowed, almost closed; and its walls, corresponding with the whole of the ulcerated surface, are infiltrated by some morbid growth, so as no longer to present a distinction between its several coats; the upper and lower margins of the ulcerated surface are slightly raised and everted. Immediately below the ulcer the mucous membrane is unaltered in appearance, and the fibres of the muscular coat are separate and distinguishable. On the left side of the strictured portion of the œsophagus, and reaching for some distance below it, is a cavity formed apparently in the soft tissues around the œsophagus, and which communicates above with its interior.

"From a woman, æt. 33; admitted under Mr. Erichsen's care, January 1859. The patient's ailment commenced nearly four years previously (April 1855), with slight soreness of the throat opposite the crico-thyroid membrane, which persisted in spite of various remedies employed. In December 1858 considerable difficulty in swallowing fluids came on, and by the end of that month she was unable to swallow either solids or liquids, the latter being ejected by the nose or mouth almost immediately after being taken. On admission nothing larger than a No. 6 gum-elastic catheter could be passed through the stricture, and even this with some difficulty. The stricture appeared to be on a level with the cricoid cartilage; there was no external swelling. Nothing in the family history of the patient threw any light upon the nature of the disease, nor was any roughness felt during the passage of the instrument; nor did any hæmorrhage follow this. Beef tea, eggs, &c., were injected regularly into the stomach by a catheter; but about three weeks before her death (February 6, 1859) it became impossible to pass any instrument. Nutrient enemata were then successful for about a fortnight; but the bowel became then so irritable that it would not retain the fluid injected, and she died of inanition. A microscopic examination showed the growth to be an epithelioma."

"1047. The lowest three inches of an œsophagus with the cardiac portion of the stomach, the œsophagus being the seat of a malignant tumour. The parts have been divided through the middle of the growth, which is somewhat fusiform, and measures about an inch and a half in breadth. By the pressure of the tumour about an inch of the œsophagus is considerably narrowed; over its upper surface the mucous membrane is ulcerated. The highest part of the growth lies between the mucous membrane and muscular coat of the œsophagus. A microscopic examination showed the growth to be an epithelioma."

Treatment.—The plans of treatment which demand the surgeon's serious attention, as being the only means at his disposal for giving relief to the patient, are: œsophagotomy; œsophagectomy (internal or external); gastrostomy: the passage of a small gum-elastic œsophageal tube; and, lastly, Mr. Symonds' method of passing a tube, through the stricture, furnished with a funnel-shaped end, which rests upon the upper face of the stricture, thus preventing its further descent in the canal. A case illustrating the use of this form of œsophageal catheter was shown at the Clinical Society on the 23rd January, 1885, where a patient with malignant stricture of the œsophagus was exhibited wearing one of them; the tubes also were shown. The patient, a man, aged 40, gave a history of seven weeks' dysphagia before coming under treatment on the 23rd June, 1884. At that time he was unable to swallow, and it was impossible to pass a bougie. He, however, on the day of admission, managed to swallow some milk, and in a few days took fluids freely. The first tube was passed on the 15th July. This was the usual long œsophageal catheter, and projected from the mouth. It proved a source of great discomfort, and had to be removed in thirty-six hours. The long tube produced much laryngeal irritation, and, by plugging the stricture, prevented the descent of the saliva, and gave rise to constant expectoration. The tube brought before the Society by Mr. Symonds was designed to remove these inconveniences, while retaining the advantages of the method of treating œsophageal stricture by permanently wearing a tube. Its length was about six inches; one end expanded into a funnel, having an outside diameter of half to three-quarters of an inch; the other had the same construction as an ordinary catheter. The tube was passed through the stricture, the funnel resting on its upper face, thus preventing its further descent. For removing it, a piece of strong silk was attached, carried out of the mouth, looped over, and fastened behind the ear. These tubes were made of gum-elastic material. The patient had been wearing the catheters since the 15th July. They had been renewed at various intervals—at first of a week, and later they had been retained a fortnight and three weeks. No difficulty was experienced in removing them, nor did the patient suffer any inconvenience from their presence. The man could swallow fluids freely, and had gained in weight. The advantages claimed for this form of tube were that, while maintaining a passage into the stomach, it did not interfere with deglutition, produced no irritation, was not unsightly, allowed of the swallowing of the saliva, and, moreover, retained to the patient the pleasures of taste. The man was able to move about with comfort, and, except for the silk passing out of his mouth, was not aware of the presence of the tube. It was suggested that, if the cases of this disease were taken earlier, a larger tube might be employed, and the patients kept in comparative comfort, while at the same time the number of cases necessitating gastrostomy would be greatly diminished. It was the desire to avoid this operation, often so unsatisfactory, that led to the construction of the tube.

It is to the relative merits of these different operations that we must now turn our attention; and it will be well, I think, to commence with the less heroic method, namely, the passage of a gum-elastic œsophageal catheter, or Symonds' funnel-shaped tube, through the stricture, retaining it there, and feeding the patient by this means. It has been suggested by many surgeons that there is very great danger in passing these instruments through the stricture, as, owing to the destructive nature of the disease, and the excessive friability of the parts so affected, there is a great risk of pushing the catheter through the walls of the œsophagus into some of the neighbouring structures or cavities; further, that troublesome hæmorrhage is often set up which is difficult to arrest. Another argument against their use is that in very tight strictures the part just above the stricture is much dilated and sacculated, and there is, consequently, a great difficulty in hitting off the lower opening; and, secondly, if any force be used, the instrument is liable to be pushed through the thinned and weakened walls of the œsophagus.

I think every one will recognize that these are very good and cogent reasons against the use of the tubes in some cases of stricture; and, as Mr. A. Durham remarks, if the tube be clumsily or carelessly used, there may be much danger, but he has no fear at all in the matter, if the instrument be soft, and the surgeon bear in mind that his duty is not to "force a passage, but to find a way," through the stricture.

Mr. Arthur Durham relates a case that illustrates this very forcibly. It was that of a woman under his care at Guy's Hospital, who suffered for a considerable time from dysphagia. A large growth had been recognized at the back of the larynx, no doubt epitheliomatous; and the question was raised of the removal of the larynx. She was obliged to leave the hospital for a time, and on her return the growth was too advanced for operative measures. She was therefore fed as well as she could be. There was no very serious interference with the voice, or dyspnœa. Later on, complete dysphagia occurred, and for some two or three days she was nourished by nutrient enemata.

The question then arose, whether gastrostomy, œsophagotomy, or the removal of the larynx and pharynx, should be resorted to. Mr. Durham succeeded in passing a No. 7 catheter into the stomach, and the patient was rendered comfortable. The catheter has been in four months, being changed from time to time. She was fed entirely through it. The growth could be seen—a large malignant mass, growing from the posterior wall of the larynx and round the pharynx. She had never had the slightest pain or inconvenience. Mr. Durham naïvely asked: Would this woman have been in a better condition if he had removed the larynx and pharynx?

Dr. Küshaber, at the Congress of 1884, brought forward a number of cases in which he had passed tubes into the stomach, and left them in an indefinite time; but, as a rule, patients do not bear them to be retained so long a time.

The tube suggested by Mr. Symonds, and already described, has, I think, many advantages for cases in which the stricture is situated below the larynx; in these it does not produce any laryngeal irritation, it allows the patient to feed himself in the ordinary way, and, above all, it allows the flow of saliva to descend into the stomach, and so gives relief to the excessive annoyance of constant expectoration or dribbling of the saliva from the mouth.

Œsophagotomy.—I have had no experience of this operation; it was first suggested, I believe, by Billroth. Mr. Reeve, however, at the Clinical Society, strongly advocates œsophagotomy, and he brings forward many arguments in its favour, which, if he could maintain by statistics, might lead some to follow in his footsteps. He lays the following rules down:—

"1. Because of the great mortality after gastrostomy, and also because of the more frequent occurrence of malignant stricture in the upper portion of the tube, œsophagostomy was by far the preferable operation. 2. Even in cases where the stricture was as low down as the manubrium sterni (its depth rarely being very great), œsophagostomy was indicated as a preliminary or exploratory operation; and, if it were found that the little finger or sound could not be passed through the narrowing, gastrostomy might then be performed. 3. If it resulted that the opening in the œsophagus had been made below the stricture (as in most cases would be desired), the operation could be completed by stitching the mucous membrane to the edges of the wound, and the stricture might, if thought proper, be dilated through the opening either at the time of opening or subsequently. 4. If the diseased œsophagus were reached, and no opening into it could be made through healthy walls, then it might be carefully performed, either by the finger or the thermo-cautery. 5. Œsophagotomy had been many times done, œsophagostomy several, and never had these operations caused any grave local or general symptoms, or, as operations, led to the death of the patient; whereas gastrostomy had proved most fatal. 6. The operation should be done on the left side of the neck, and a sound, if possible, be passed, that of Vacca-Berlinghieri being the best.

The skin-incision should be rather nearer the mid-line than that for ligature of the common carotid, and should extend from half-an-inch above the episternal notch to the level of the upper border of the thyroid cartilage. The surgeon should stand on the left of the patient, looking obliquely down and across his or her body. A tube with a funnel-shaped end should be passed, tied in place, and nourishment administered as soon as the tendency to vomit caused by the anæsthetic had passed off. It was necessary to make the opening in the walls with a sharpish stab, to prevent the loose mucous membrane being pushed before the knife. The edges of the wound might be stitched up, and care taken that no food entered it. 7. The operation should be undertaken before the patient's strength was much exhausted, and even before obstruction was complete, because frequently attempts to swallow produced spasmodic suffocative dyspnœa, as in the first case related. 8. In severe cases of simple, fibrous, or syphilitic stricture in the tracheal or upper thoracic portion of the tube, œsophagostomy was indicated, as then the operation might be curative, as well as palliative."

As all operations in connection with malignant diseases of the œsophagus can but be palliative, without the surgeon is able to remove the whole mass by excision, I think that unless the disease is situated very high up the operation of œsophagotomy would be very difficult, and certainly not so free from risk as Mr. Reeve would have one to suppose. Undoubtedly, if the opening can be made below the stricture, and the mucous membrane stitched to the edges of the wound, the patient would be placed in a comparatively comfortable position. But I take it this could very rarely be the case, and if such a case did occur, I think it must be in such an early stage that there would have been little or no difficulty in passing a tube through the stricture and relieving the patient in that way.

Œsophagectomy.—Complete excision of a portion of the œsophagus was first suggested by Billroth in the year 1872. He determined to operate in the first instance on a dog. The full description is to be found in Langenbeck's "Archives," 1872, in a paper bearing the title of "Ueber die Resection des Œsophagus," and runs as follows:—

Professor Billroth states that some time ago, after a post-mortem examination of his first patient affected with carcinoma of the œsophagus, the possibility suggested itself of making a resection of this part of the alimentary tube. The fact that the lymphatic glands in the neighbourhood of the diseased part are not generally affected, and the partial success which had attended the operation of œsophagotomy in this disease, together with the analogy of external urethrotomy in cases of gangrene or ulceration of the urethra, seemed to lend support to this idea.

On the 21st April, 1871, a large dog was put under the influence of chloroform, and a piece about an inch and a-half in length was cut out of the whole circumference of the œsophagus. The lower end of the divided tube was then fastened by a couple of sutures to the skin at the margin of the external wound. Up to the 26th of the same month the animal was fed with milk through a tube passed into the wound, but on and after this date the tube was passed by the mouth. A week after the operation the sutures were removed. By the end of June the fistulous opening had completely closed, and the process of healing would have been quicker if it had not been that the dog, like a human patient, dissatisfied with "milk diet," purloined the more solid food of neighbouring victims to science. After the closure of the œsophageal fistula, which took place at the end of June, the tube was daily dilated by a bougie of the diameter of a large index finger. After the healing of the wound the dog was in capital condition, eating meat, potatoes, &c., but the variety of fare was not allowed to extend to bones. On the 26th July the animal was killed by cyanide of potassium; and all that was found as a trace of the operation was an annular scar scarcely half a line in width, moreover easily dilatable.

To Czerny, however, was reserved the honour of first operating upon a human being; it was the case of a country-woman, 51 years old, poorly nourished, but otherwise in fair condition, seeking for relief. For nearly five months previously she had suffered from difficulty in swallowing, but at first had thought little of it, for in 1875 a similar difficulty had existed for a while, then ceased spontaneously. But now it gradually grew worse, till she could no longer swallow solid food. A soft, easily bleeding swelling could be felt with the finger far down the pharynx, causing so great obstruction that a bougie could not be passed beyond it. No glandular enlargement was detected. On the 2nd May Czerny cut down on the left side of the neck, as for œsophagotomy, and completely removed six centimètres of the upper end of the œsophagus. The resected portion included the whole of the disease, an epithelial ulcer which involved the tube in its entire circumference, but had not at any point penetrated the muscular coat. The stomach end of the divided œsophagus was fastened to the edges of the opening in the neck, and through it food was introduced by means of a funnel into the stomach. She recovered, and left the hospital; and five months later came to report herself as "quite well, and at work in the fields, able to feed herself comfortably through the funnel and tube." Indeed, so satisfied was she with her condition, that she steadfastly refused the further operation which Czerny had planned for bringing together the divided ends of the œsophagus.

That œsophagotomy may be practised on simple stricture high up, or for the removal of foreign bodies in the pharynx or upper part of the œsophagus, there can be no doubt; but for malignant disease I do not think it should be resorted to.

Gastrostomy was practised as early as 1635, when a surgeon named Shoval opened the stomach of a man who had swallowed a knife six inches and a half long, which had been retained in the viscus for about six weeks. He performed the operation by making a straight vertical incision through the left hypochondrium, two fingers' breadth below the false ribs. The wound was united by five sutures, and dressed with tents impregnated with tepid balsam, and a cataplasm of bolar earth, white of egg, and alum. The wound healed quickly and well. I find no record of the operation being performed after this until the year 1849, when Sédillot operated on a man for malignant disease of the œsophagus, the patient dying ten days after from exhaustion. The record of cases operated upon between 1849 and 1876 constitute an unbroken series of failures; the operation was repeated some twenty-five times, and most of the patients died within the first few days, one only surviving forty days. In 1876 Verneuil obtained the first real success. His patient, a healthy lad, 17 years of age, some months previously had swallowed a solution of caustic potash; this was followed by intense pain in the throat, with exfoliation of the mucous membrane of the stomach. When the acute symptoms had subsided, the patient experienced great difficulty in swallowing. The dysphagia increased, and attempts at catheterism of the gullet were frequently made, but without success. The stricture was situated about seven inches below the upper end of the gullet, and so low as to preclude the idea of œsophagotomy; it was therefore decided to perform gastrostomy.

The portion of the stomach exposed was carefully stitched to the lips of the wound in the peritoneum and abdominal wall. The viscus was then laid open, and a vulcanite tube introduced. The patient made a good recovery, and almost at once was able to take liquid food through the artificial opening. At the time of the operation the weight of the patient was 72 lbs., a month later 75 lbs., and three months after 92 lbs. The lad lived seventeen months.

Since 1876 the operation has been frequently repeated. The most elaborate statistics of the results are published by Blum.* He tabulates 131 gastrostomies; of these, 85 died before the twentieth day, that is, in consequence of operation, thus giving a mortality of 65 per cent.; 38 survived from several months to two years and more. One other point which these statistical Tables point out is worthy of notice; it is this: by eliminating the gastrostomies for cancerous disease of the œsophagus, we have left 25 examples in which the operation has been performed for fibrous or non-cancerous strictures. Of these, only 12 patients died before the twentieth day, showing a mortality of 48 per cent.

I think that if the merits of gastrostomy had no other basis than its success in non-cancerous strictures, it ought to claim our respectful consideration; and it is quite possible that if in cancerous cases we resorted to the operation at an earlier period, and before the patient's power had fallen to a low ebb, the successes would be more numerous.

In the years 1858 and 1859, in this country, gastrostomy was first performed by Mr. Cooper Foster, who operated twice; in one case for malignant disease causing complete obstruction of the œsophagus; and in the other for a stricture caused by the patient swallowing a solution of caustic alkali. The first of these cases lived forty-four hours, and in the second, death occurred on the fourth day from peritonitis. Since that time the operation has been practised many times by various surgeons, but to Mr. Howse is undoubtedly due the credit of suggesting the desirability of dividing the procedure into two parts: the first, opening the peritoneal cavity, and accurately stitching the visceral peritoneum to the edges of the wound, being careful that the visceral and parietal coverings of the peritoneum are brought into intimate contact; and later on, on about the fifth day, opening the stomach. By this means, undoubtedly, the risk to the patient is very much lessened.

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* "Archives Générales de Médecin," November 1883.

It must be borne in mind here that gastrostomy after all is only an operation that is performed with the view of relieving the patient, and with the hopes of prolonging life slightly. I have collected thirty-five cases where gastrostomy has been performed for malignant stricture of the œsophagus, and undoubtedly the results are not encouraging. Thus, only one survived six months, one three months, two were alive at the time the cases were reported, one forty-two days, and the other three months after the stomach was opened. The average length of time patients lived after the performance of the operation was one month.

Gastrostomy has been resorted to according to Gross in at least 167 cases for carcinomatous stricture of the œsophagus, of which 49 died as the direct or indirect result of the operation, 21 from peritonitis, 11 from pneumonia, bronchitis, or pleurisy, 10 from shock, 4 from phlegmonous gastritis, 2 from uræmia, and 1 from septicæmia; the mortality was therefore in these cases 29·34 per cent., which is, as Gross points out, greater by 14·34 per cent. than gastrostomy for foreign bodies, only 3 out of 20 of the latter having proved fatal. Of the entire number, 117 died within a month, 4 were living, but how long cannot be determined, and 46 survived longer than one month, the average duration of life being, after the stomach was opened, thirty-three days.

Of the 46 that lived upwards of one month, 28 expired subsequently—2 in five weeks, 2 in seven weeks, 9 in two months, 2 in two months and a-half, 3 in three months, 2 in four months, 2 in five months, 1 in six months, 1 in seven months, 1 in seven months and a-half, 2 in eight months, and 1 in ten months. Of the remaining 18, 3 were living at the expiration of one month, 2 at forty days, 4 at two months, 2 at three months and a-half, 2 at four months, 1 at five months, 1 at six months, 1 at seven months, 1 at twelve months and nine days, and 1 at thirteen months. The last two cases, the most successful on record, were under the care of Mr. W. Whitehead, of Manchester.

Professor Verneuil, in 1879, published some statistics showing that in thirty cases in which gastrostomy had been performed for cases of malignant disease of the œsophagus, only one survived a month. The statistics will, however, undoubtedly in the future be far more encouraging, since abdominal surgery is becoming so very much better understood. The chief object is to operate early; by adopting this course I am inclined to think the progress of the disease may be retarded, as the constant irritation to the raw ulcerated surface by substances passing over or lodging in the stricture tends much to aggravate the distress of the sufferer and to cause the disease to increase more rapidly; just as will be shown in the chapter on cancer of the rectum, colotomy alleviates the sufferings and prolongs life.

It now becomes my task to examine into the results of the different operations, and to try and arrive at a conclusion as to the method of treatment which is the most likely to give relief. And here let me pause a moment to again emphasize any remarks I may make with the statement that all operations whatsoever are simply palliative; that no cure can be anticipated, but that undoubtedly much may be done to alleviate the sufferings of the patients, and, I believe, if seen early enough, to prolong life.

The operation of œsophagotomy has been so rarely done for malignant disease, and the difficulty of diagnosing for certain the exact limits of the disease is so great, that at present I would prefer speaking most guardedly upon the subject; but I cannot help thinking, unless the surgeon can be quite sure that the disease is limited in extent to the pharynx or the upper part of the œsophagus, the operation of œsophagotomy should never be practised. Again, if it is certain that the disease is limited to a very small portion of the upper part of the œsophagus, such as to warrant the performance of this operation, I think the surgeon might go still further, and endeavour to excise the whole of the diseased parts, and so give the patient the benefit of the only operation that can by any possibility give him a chance of a radical cure. Œsophagostomy has been done in 21 cases, as recorded by Dr. Gross; 4 recovered, and 17, or 80·95 per cent., died. Of the latter, however, 5 died of exhaustion, and 12 as the result of the operation—7 from shock, 1 from septicæmia, 1 from pyæmia, 1 from pneumonia, 1 from phlegmon of the anterior mediastinum caused by penetration of the mediastinal tissues by the sound, and 1 from penetration of the posterior mediastinum by the tube. Hence the mortality may be placed at 57·14 per cent. All the deaths occurred before the nineteen days after the operation, excepting that from septicæmia, which took place in three months.

Of the 4 who recovered from the operation, 1 lived two months, 1 three months, 1 five months, and 1 sixteen months. The average duration of life in all the cases after the operation was forty-six days; but if, as Dr. Gross remarks, the case which lived sixteen months be excluded, on account of the uncertainty of the true nature of the disease, the average life will be reduced to twenty-nine days.

Another danger to be encountered after this operation is that of passing the tube through the œsophagus into the surrounding tissues when feeding the patient. This was done in four cases referred to above. Thus, in one case, gangrene of the retro-œsophageal tissues was produced; in another, phlegmonous inflammation of the anterior mediastinum; the posterior mediastinum was perforated in the third case.

In one case operated on by Annandale a second stricture was discovered lower down the gullet after he had performed the operation, and he was obliged to perform gastrostomy.

Internal œsophagectomy has been only practised on one occasion by Schiltz. The patient lived for six months, but the operation had to be repeated during that period five times to enable the tube to be kept open.

Œsophagectomy.—Czerny was the first surgeon to perform this operation on the human being; and in 1883 the operation was again performed on two occasions by Von Bergmann and Novaro, when the former excised an inch and a-half, and the latter two inches and a-half, of the gullet. In both these operations tracheotomy was had recourse to on account of impending death from suffocation. Von Bergmann's case died within twenty-four hours of the operation; that of Novaro was alive seven weeks afterwards. Billroth removed the œsophagus from the pharynx to the sternum, together with the entire larynx and thyroid gland. The man was fed through an elastic tube for four weeks, when the outer wound closed, and bougies were used to effect dilatation of the passage. Towards the end of six weeks the bougie entered the peri-œsophageal tissues, and the man died. Israel, in another case, extirpated a circular piece of the œsophagus, but the man died on the seventh day. Besides these, we have the case operated upon by Czerny, and already referred to, where the patient was alive and able to feed herself five months after the operation. We have also Billroth's experience of experiments upon dogs, both of which, I must say, are encouraging; but until such time as I have seen either operation practised with advantage to the patient, I cannot recommend my readers to adopt them.

Then we come to the method of passing catheters through the stricture, or adopting Mr. Symonds' method of gum elastic tubes. Both of these have much to recommend them. If the stricture be high up, I do not think Symonds' tubes would be applicable, as they would in all probability interfere with the epiglottis and cause much irritation. So that, in this class of cases, if you decide upon attempting to feed the patient by the tube, the long gum-elastic catheter is the only one that can with safety be used.

In strictures lower down, as in the upper part of the middle third and below, no doubt Mr. Symonds' tubes are a very useful advance upon the old method.

I cannot quite agree with Mr. Durham in this matter, as I am sure in many cases there is very great difficulty in passing a catheter through the stricture; and from the softened condition of the tissues around the disease, as well as the sacculated nature of the upper part of the tube in others, if the surgeon is not excessively careful in the first instance, and lucky in hitting off the opening below the dilation in the next, he will be very liable to force the tube out of the tract into the surrounding tissues, possibly into the pleura or other important parts. That tubes are not well borne is thoroughly established, and they have at the furthest to be removed every second or third day. In the matter of the long tube, by blocking up the stricture the patient is unable to swallow his saliva, which of necessity must dribble from his mouth, and be the source of the greatest misery to him. This is prevented by the use of Mr. Symonds' tubes; but even these cannot be tolerated for very many days at a stretch. In both these cases, then, the frequent passage of instruments is fraught with a certain amount of danger; in many cases the danger is very imminent, and in all cases the passage of them is accompanied by much pain to the patient and anxiety to the surgeon.

The irritation, moreover, caused by their frequent introduction must, in my opinion, of necessity be such as to lead to increased congestion of the part, and, hence, growth of the disease. I would therefore, in all cases where operative interference is indicated, recommend you strongly to adopt that measure which at once is most likely to enable you to feed your patient without interfering in any way with the disease. This can only be accomplished by *gastrostomy*. And here I would advise you in all cases to perform the operation as early as you can, after you have once recognized for certain that your patient is suffering from malignant disease of the œsophagus. Although the operation apparently has not been attended with any very good results, yet I believe this is mainly due to the fact that it usually has been resorted to as a *dernier ressort,* when the patient, in fact, would speedily have died from inanition if something were not done. If any real benefit is to be anticipated, the operation must be done early, the same as in all other operations for cancer or other malignant diseases. Undoubtedly peritonitis is much to be dreaded, but I think, by adopting the plan now universally practised in these cases of dividing the operation into two parts, as recommended by Mr. Howse, this risk is reduced to a minimum, and need scarcely be placed in the balance. Peritonitis is, in fact, nearly, if not quite, eliminated from the risk to the patient in all abdominal surgery by the precautions which are adopted in the present day. And I think, if you refer to the list of cases recorded by me, there are very few indeed that died from this complication; and I may say, in later years, peritonitis has scarcely ever been the cause of death.

It will be seen, then, that in determining upon the best course to pursue in different cases, the selection must be governed by the nature, situation, and extent of the disease.

Catheterism, as being the simplest, should be practised first, with the double object of discovering the seat and extent of the disease and sustaining your patient's strength; in all cases, however, great caution and patience must be exercised. If the cancer be situated at the upper part of the œsophagus, base of tongue, or pharynx, then œsophagotomy may be justifiable; but I should recommend in even such cases that gastrostomy should have the preference, it being the best means of introducing food into the system without in any way interfering with the seat of the disease, and preventing the accumulation of food at or above the seat of mischief, and thus being the most likely operation to prolong life and retard the growth of the disease.

Moreover, the surgeon is never certain that a second growth may not exist lower down in the œsophagus, in which case this operation would be worse than useless.

Operations.

Œsophagotomy.—To perform this operation, the patient should be in the recumbent position, and placed fully under the influence of an anæsthetic. A pillow should be passed under the shoulder so as to allow of the head being thrown well back, the face being turned over to the right side. An incision is then to be made on the left side along the groove in front of the sterno-mastoid muscle from a point about opposite the middle of the thyroid cartilage to near the sternum. It is important that this incision should be sufficiently free to allow plenty of room for the further dissection required to reach the œsophagus. The platysma and cervical fascia having been carefully divided, the carotid sheath with its contained vessels is brought into view. This must be cautiously separated by the handle of the knife or other blunt instrument from the laryngeal muscles; the thyroid body and trachea being held out of the way by retractors, the œsophagus is then seized with a pair of forceps, and the point of the knife sharply thrust into it, and the tube opened to the extent required. The cut surfaces of the œsophagus are then drawn out and stitched accurately to the edges of the wound. The parts should be thoroughly dusted with iodoform, and a pad of antiseptic gauze or wool applied over the wound.

Should the surgeon decide to resect the whole of the diseased mass, the same steps should be taken, and by careful and tedious dissection the parts may be removed.

After-treatment.—The patient is to be fed by means of a soft india-rubber tube introduced into the lower end of the œsophagus, and beef tea, milk and egg, or other liquid food poured in by means of a funnel.

Gastrostomy.—I think the best method of performing this operation is: the patient having been placed in the recumbent position, with a small pillow placed under the centre of his back, and he being thoroughly anæsthetized, an oblique incision three inches long, commencing a little below and to the left of the ensiform cartilage, and about an inch to the inner side of the border of the left costal cartilages, and nearly parallel with them, is carried through the skin and superficial tissues; the muscular fibres and other tissues should be carefully divided down to the peritoneum. All bleeding points must be seized with the clamp forceps, and, if necessary; ligatured before the peritoneal cavity is opened.

Mr. Durham recommends a vertical incision three or four inches in length over the upper part of the left linea semilunaris.

Sédillot advises and practises a crucial incision, passing through the upper part of the left rectus.

Labbé makes an incision about two inches in length, extending from the left linea semilunaris outwards for about two inches, parallel to the costal cartilages and distant from them about half-an-inch.

The incision usually adopted, however, is the first described, and it is most important to have plenty of room; the length of the incision in no way adding to the risk of the operation to the patient.

The peritoneum should be divided the whole extent of the external wound. In the dead body it is found that the anterior wall of the stomach when undistended touches the abdominal parietes in a triangular space, bounded above, on the left side by the costal margin, on the right side by the edge of the liver, and below, by a line drawn from about the centre of the inner costal cartilage transversely outward to the liver. This is an almost constant condition, and is only interfered with when the left lobe of the liver is enlarged. The liver usually touches the costal margin on the left side behind the linea semilunaris at a part which lies over the right cartilage. It consequently follows that it is useless to prolong the incision through the rectus muscle and thus expose the liver.

The peritoneal cavity having been opened, if the surgeon bears in mind the above-named relation, he will have no difficulty in finding the stomach, which should be brought out through the wound and stitched accurately to it, taking the greatest care that the parietal and visceral covering of the peritoneum are brought in close contact. It must be borne in mind that the safety of the patient depends on the firm union of the stomach to the abdominal wall. Difficulty has, however, been met with in finding the stomach. The late Mr. Maunder encountered a serious difficulty, which caused him to open the transverse colon instead of the stomach. To avoid a similar accident, Schörborn, of Königsberg, has suggested that a small india-rubber bag should be fixed to the end of an œsophageal tube; as soon as the latter has passed through the stricture the bag is compressed; this forces the anterior wall of the stomach into the wound, and the operation is clearly rendered easier: this suggestion, of course, presupposes the permeability of the stricture, which is rarely the case. All recent authors seem to agree that the sutures must be numerous and close together; there are some who think that the parietal sutures should be passed only through the skin, while others maintain that they should traverse the whole thickness of the abdominal wall; others, again, consider that the stitches should be passed through the peritoneum and skin only, thus bringing the greatest possible amount of parietal peritoneum in contact with the visceral layer. I am certainly in favour of the latter method; further, I think, so important is it to obtain accurate apposition of the two peritoneal coverings, that it is quite worth the extra time and trouble to adopt Professor Dittel's method of uniting the parietal peritoneum and skin by a few interrupted sutures, then stitching the anterior wall of the stomach to it, being careful to pass the needle through only the peritoneal and muscular coats of the viscus, forming broad loops, and then through the whole thickness of the abdominal wall. The stomach being thus firmly attached to the parietal walls of the abdomen by numerous sutures, the wound should be dusted over with iodoform and dressed with thymol or some other soft dry antiseptic dressing, and the patient returned to bed. He should be fed for the succeeding four or five days entirely by means of nutritive enemata, at the end of which time the dressing may be removed and a small opening made into the stomach sufficiently large to admit about a No. 10 catheter; this completes the operation. It is not, however, always so easily accomplished, and for this purpose Mr. Bryant has suggested that at the time of performing the first part of the operation two stitches should be introduced through the peritoneal covering of the stomach near the centre of the wound, which serve to steady the parts while the incision is being made. Another method of opening the stomach is to have the exposed portion held well forward, and then passing a tenotomy knife obliquely through its coats, making a small opening, then slipping a silver probe, bent to a right angle about an inch from its point, along the blade of the knife, next removing the knife and introducing another probe similarly bent; then finding out the course of the muscular fibres, and pulling at right angles to them, an opening is secured through which it is easy to pass a No. 10 catheter. I do not consider these measures at all necessary, as I find little difficulty in incising the wall of the viscus. An anæsthetic is unnecessary in this part of the operation, as the stomach wall is devoid of pain.

An ordinary catheter connected to a funnel by an india-rubber tube should be inserted into the stomach, and warm peptonized beef tea or milk introduced, at first very little at a time; the food can be retained by using a spring clip which closes the tube. The parts around the opening should be dusted over with powdered chalk, as the gastric juice is very apt to escape alongside the tube and irritate the skin, in fact digest it.

The patient at first should be fed every two or three hours; by degrees the intervals may be lengthened, until ultimately the patient will be able to feed himself as occasion requires, with very finely minced meat, eggs, beef tea, milk, and the like.

Mr. B. Barrow reported a case at the Medical Society in December 1884, in which he had adopted another form of procedure. Strict antiseptic precautions being used, an incision through the skin, commencing an inch and a-half below the xiphoid cartilage, and continued downwards parallel to the lower margins of the costal cartilages on the left side, and about a finger's breadth from them, for about three inches. The deeper incision was more vertical, taking the direction of the fibres of the rectus muscle. The peritoneal cavity being thus opened, the transverse colon first presented itself, and gave a little trouble; however, by following upwards the great omentum, the stomach was reached and drawn out of the wound. A portion of its anterior wall was pinched up by the fingers, and two hare-lip pins made to transfix it through its whole thickness, in a direction transverse to the skin-wound, the pins being inserted half-an-inch apart. Catgut sutures were now introduced so as to bring accurately together the deep peritoneal as well as the superficial parts of the wound closely around the pins and the protruding portion of the stomach; but no sutures were introduced into the stomach, which was maintained in position by the pins. Iodoform was dusted over the wound, and dry antiseptic dressings applied, which were not changed for five days, when the wound was found to have united by the first intention.

Cases of Cancer of the Œsophagus, collected from Cancer Hospital

No.	Character.	Sex.	Age.	Seat.	Ulceration.	Affecting surrounding or other parts of Body.	Total Duration in Months.
1	Ep.	M.	38	Middle	Yes	No	8
2	Ep.	M.	40	Lower	Yes	No	9
3	Ep.	M.	....	....	Yes	No	....
4	...	M.	56	Stricture	....	....	....
5	Ep.	M.	64	Upper	Yes	....	10
6	Ep.	F.	60	Middle	Yes	Neighbouring tissues	6
7	Sch.	F.	35	Middle	Yes	....	96
8	Ep.	M.	65	Middle	Yes	....	....
9	Ep.	M.	67	Upper	Yes	Left pyramid of thyroid	10
10	....	M.	17	Stricture, swallowing caustic potash	....	....	....
11	Ep.	M.	59	Lower	Yes	Pericardium, heart adherent	13
12	Ep.	M.	60	Middle	Yes	....	15
13	Sch.	M.	48	Lower ...	Yes	....	5
14	Ep.	M.	61	Lower	Yes	Lesser curvature of stomach	9
15	Sch.	M.	45	Lower	Yes	Liver	7
16	Ep.	F.	45	Middle ...	Yes	Thor. aorta	9
17	Ep.	F.	60	Upper	Yes	....	10
18	Ep.	F.	58	Middle	Yes	....	7
19	Ep.	M.	50	Lower	Yes	Aorta, trachea	11
20	Ep.	F.	36	Upper	...	....	12
21	Ep.	F.	56	Middle	Yes	....	7
22	Ep.	M.	56	Middle	Yes	Aorta	3
23	Sch.	M.	56	Middle	Yes	Liver, spleen, kidney	....
24	Ep.	M.	59	Middle	Yes	....	6
25	Sch.	M.	45	Middle	No	....	9
26	Sch.	M.	58	Middle	No	....	12
27	Sch.	M.	55	....	....	....	14
28	...	F.	51	Stricture	....	..	....
29	Ep.	M.	60	Lower	No	....	8
30	Ep.	M.	40	Upper	Yes	Trachea	....
31	Ep.	F.	45	Upper	Yes	....	....
32	Ep.	M.	54	Middle	Yes	Stomach	8
33	Ep.	M.	46	Middle	Yes	....	12
34	Ep.	F.	60	Lower	Yes	....	4
35	Sch.	M.	59	Lower	Yes	....	7

the Medical Journals, Reports of Societies, and Case Books.

Affection of Glands.	Affection of Lungs.	Gastrostomy.		Authority.
No	No	Yes.	Death, 7 days	B. M. J., 1872, vol. i, 623.
No	Yes	Yes.	Death, 45 hours	„ 1872, vol. i, 623.
....	....	Yes.	Death, 6 days	Clin. S. R., June 8, 1872.
....	....	Yes.	Death, 56 hours ...	B. M. J., 1873, vol i, 588.
....	....		....	Path. R., Nov. 17, 1874.
Yes	No		....	Lancet, 1875, vol. i, 105.
No	No		....	„ 1875, vol. ii.
....	....		....	„ 1876, vol. ii, 751.
No	No	Yes.	Death, 40 days	„ 1875, vol. i, 679.
....	....	Yes.	Recovery	„ 1877, vol. i, 51.
....	....	Yes.	Death, 91 hours	„ 1877, vol. i, 532.
No	No		....	„ 1877, vol. i, 940.
No	No		....	„ 1877, vol. i, 940.
Yes	Yes	Yes.	Death, 4 days	„ 1879, vol. i, 475.
Yes	No	Yes.	Death, 8 days	„ 1879, vol. ii, 425.
No	No		....	„ 1880, vol. i, 447.
No	No		....	„ 1880, vol. i, 717.
No	No		....	„ 1881, vol. i, 333.
....	....	Yes.	Death, 4th day ...	„ 1881, vol. ii, 893.
....	....	Yes.	Alive, 42 days	„ 1881, vol. ii, 942.
Yes	Yes		....	„ 1882, vol. i, 311.
Yes	Yes, L.		....	„ 1882, vol. i, 311.
Yes	Yes		....	„ 1883, vol. i, 13.
No	No	Yes.	Death, 8 days	„ 1883, vol. ii, 57.
Yes	No	Yes.	Death, 10 weeks	„ 1883, vol. ii, 57.
Yes	No	Yes.	Death, 3 days	„ 1883, vol. ii, 57.
Yes	Yes		....	„ 1884, vol. i, 253.
....	....	Yes.	Alive, 6 weeks ...	„ 1884, vol. ii, 182.
....	....	Yes.	Death, 13 days	„ 1881, vol. i, 7.
....	....		....	B. M. J., 1876, vol. i, 364.
....	....		....	„ 1876, vol. i, 364.
....	....		....	„ 1876, vol. ii, 445.
....	....	Yes.	Death, 3 weeks.	„ 1878, vol. ii, 267.
....	....		....	„ 1880, vol. i, 249.
....	....		....	„ 1881, vol. ii, 974.

No	Character.	Sex.	Age.	Seat.	Ulceration.	Affecting surrounding or other parts of Body.	Total Duration in Months.
36	Ep.	M.	61	Lower	Yes	....	10
37	Ep.	M.	54	Lower ...	Yes	....	7
38	Ep.	F.	45	Lower	No	....	6
39	Sch.	M.	56	Middle ...	Yes	Aorta, left lung	4
40	Ep.	M.	60	Middle	Yes	....	3
41	Ep.	M.	65	Upper	Yes	....	3
42	Ep.	M.	64	Lower	....	....	3
43	Ep.	F.	45	Middle	Yes	....	....
44	Ep.	M.	55	Upper	Yes	Bronchial gland	4
45	Ep.	M.	42	Lower .	Yes	Aorta, right lung	14
46	Ep.	M.	46	Middle	No	....	9
47	....	M.	51	Stricture..	No	....	....
48	Ep.	M.	56	Lower	Yes	Spleen and lung	....
49	Sch.	M.	55	Lower	No	Pericardium	14
50	Ep.	M.	52	Middle	Yes	Aorta, bronchi, pericardium, left auricle of heart	4
51	Ep.	M.	50	Lower	Yes	....	13
52	Ep.	M.	40	Middle	No	....	7
53	Ep.	M.	43	Middle	Yes	....	13
54	Ep.	M.	68	Middle	Yes	Right bronchi	6
55	Ep.	F.	58	Middle	Yes	....	12
56	Ep.	F.	42	Upper	Yes	....	8
57	Ep.	M.	64	Middle	....	....	3
58	Ep.	M.	64	Upper	....	....	15
59	Ep.	M.	37	Upper	Yes	Pharynx and tonsil	12
60	Ep.	M.	49	Upper	Yes	....	15

Affection of Glands.	Affection of Lungs.	Gastrostomy.	Authority.
Yes	Yes	Yes. Death, 2 months	Lancet, 1881, vol. i, 573.
Yes	No	Yes. Death, 21 days	,, 1881, vol. ii, 53.
....	....	Yes. Death, 6 days	,, 1884, vol. ii, 223.
Yes	Yes	....	Can. M. S., 1882.
No	No	Yes. Death, 24 hours	Dul. Surg. Soc., Feb. 10, 1882.
No	No	Yes. Death, 13 days	B. M. J., 1882, vol. i, 538.
No	....	....	,, 1882, vol. i, 539.
No	No	....	,, 1882, vol. i, 664.
Yes	No	Yes. Death, 3 months	,, 1884, vol. ii, 223.
No	No	Yes. Death, 6 months	,, 1884, vol. ii, 223.
....	....	Yes. Death, 3 weeks	,, 1884, vol. ii, 649.
....	....	Yes. Recovery	,, 1884, vol. ii, 651.
No	Yes	....	,, 1884, vol. ii, 1194.
Yes	No	....	Path. Rep., vol. xxxv, 190.
No	No	Yes. Death, 3 months	B. M. J., 1884, 1134.
....	....	Yes. Death, 12 days	,, 1884, vol. ii, 558.
....	....	Symonds' tube	,, 1884, vol. i, 231.
....	....	Yes. Died 7th week	,, 1885, vol. i, 937.
....	Yes	....	,, 1885, vol. i, 594.
Yes	....	Yes. Death, 12 hours	Middlesex Hosp. Rep., 1885.
Yes	....	Yes. Death, 13 days	
Yes	....	Yes. Death, 10 days	
....	....	Yes. Alive, 3 months	Surgical Record, 1885, 8.
Yes	....	Yes. Death, 5 months	Cancer Hospital.
Yes	....	Yes. Death, 5 weeks	,, ,,

CHAPTER VII.

CANCER OF THE STOMACH.

THE mortality caused by cancer of the stomach is very considerable. This organ yields to the uterus alone in the frequency with which it is attacked by cancer.

From statistics collected, the result of post-mortem examinations, Tancher estimates the frequency of gastric cancer, as compared with that of all other causes of death, at 0·6 per cent.; Virchow, at 1·9 per cent. in 3,390 cases of death; Wyss, at 2 per cent., analysis of 4,800 deaths; and d'Espine, at 2½ per cent., analysis of deaths occurring in the Canton of Geneva. These statistics were based upon an analysis of 382,851 deaths in the Department of the Seine. No doubt they are open to many sources of error, but practically they are sufficiently correct to show how common gastric cancer is.

Dr. Brinton, in analyzing the result of 8,468 post-mortem examinations, made chiefly in English hospitals, found gastric cancer in 1 per cent. of the cases. Gussenbauer and Von Winiwater found the disease in 1½ per cent. of the 61,287 autopsies in the Pathological Anatomical Institute of the Vienna University.

Dr. Welch, in his excellent article on cancer in the stomach, found in New York, for the fifteen years 1868 to 1882 inclusive, of the 444,564 deaths during that period, cancer of the stomach occurred in 1,548 cases, and cancer of the liver in 867 cases. This would place the ratio of gastric cancer at 0·4 per cent. to all causes of death.

In statistics he collected of primary cancer of this organ and the uterus he found:—

Primary Cancer.		Stomach.	Uterus.
		Per cent.	Per cent.
In Vienna	11,131	10·0	31
New York	7,150	25·7	24·2
Paris (Tancher)	9,118	25·2	32·8
„ (Salle)....	1,378	31·9	32
Berlin	587	35·8	25
Wurzburg	187	34·9	19
Prague (Virchow)	1,046	37·6	33·6
Geneva (Marc d'Espine)	889	45·0	15·6
Total	31,482	21·4	29·5

From these statistics, taken as a whole, it will be seen that the uterus was affected in about 8 per cent. more cases than the stomach; whereas in the number of cases collected from Berlin, Wurzburg, Prague, and Geneva, the stomach was the seat of disease at the rate of 60 per cent. above the uterus. The statistics collected by Marc d'Espine and Virchow tend to support this view; the former observer, in 889 cases of cancer he compiled, found the stomach affected in 399, and the uterus in only 139 cases; while Virchow found the stomach affected in 34·9 per cent., and the uterus in only 18·5. These statistics are believed to be very accurate, and certainly tend to prove primary cancer of the stomach in the Prague and Geneva districts to be very much more frequent than that of the uterus.

Cancer very rarely occurs as a secondary growth in the stomach; in fact, it is well known to be one of the organs in which primary cancer is most common. In Virchow's "Archives," we find that Marc d'Espine met with 399 cases of primary cancer of this organ out of 889 cases of carcinoma he collected; and Lange met with it in 210 cases out of a total of 587 cases of carcinoma. Thus, out of a total of 1,476 cases of cancer collected by these two observers, the stomach was primarily affected in 609 cases, or at the rate of 41 per cent.

Four cases of secondary cancer have been recorded by Grawitz; in two of these the disease was secondary to the œsophagus, in one the primary disease was in the testicle, and in the fourth it first showed itself in the mamma. Besides these, Cohnheim has recorded four, Petri one, and one has been observed by Weigert, while Virchow has found secondary growths in two cases. Of these eight cases, the primary growth was in the œsophagus on four occasions, in the breast twice, and once each in the testicle and the leg. Dr. Welch has collected thirty-seven cases: of these, seventeen were secondary to carcinoma of the breast, eight secondary to cancer of the œsophagus, three secondary to disease of the nose and mouth, the remainder having occurred as primary disease in other parts of the body.

All forms of malignant disease are found in the stomach, viz., medullary, scirrhus, colloid, adeno- or cylindrical-celled carcinoma, squamous epithelioma, and sarcoma.

Medullary cancer occurs chiefly about the pyloric end, and is found in the form of fungating masses or low rounded swellings which early break down, giving rise to deep ulcers with raised everted borders, and gnawed pulpy surface.

These growths have their origin in the gastric glands of the mucous membrane, extending early to the submucous tissue, burrowing under the mucous membrane, and quickly invading the muscular and serous coats.

Cylindrical-celled cancer, like the preceding, commences in the gastric glands, and presents soft nodular growths, which break down and ulcerate. This form is distinguished histologically by the presence of the tubular gland-like structures, lined with cylindrical epithelium.

Scirrhous cancer is found chiefly at the pyloric end, and commences as a diffuse thickening and induration of the walls of the viscus. The pylorus becomes more or less constricted. The inner surface is covered partly by thickened mucous membrane, partly by exposed and indurated fibrous tissue belonging to the submucous coats. Ziegler is of opinion that so-called scirrhus is often nothing but induration of the walls of the stomach, partly cancerous and partly fibroid, left as a secondary result of the ulcerative disintegration of soft cancer.

Colloid cancer contains numerous patches of colloid substance, and is found often as nodular swellings and diffuse widespread infiltration of the walls. These growths increase very quickly, often to the peritoneum, and then give rise to large semi-transparent colloid growths. This form of cancer is frequently found in very young persons.

Squamous-celled epithelioma is very uncommon, as also are the *sarcomata.*

It is often found, however, that one variety of cancer merges into another; thus, on examining a stomach of a patient who has succumbed to this disease, it not unfrequently happens that you find one part hard, and with all the characteristics of scirrhus, while the other is soft and fungoid, with all the appearance of medullary cancer, the surface of which again may here and there resemble villous carcinoma. Neither is this appearance to be wondered at, as from the construction of the viscus we find at the pyloric end the fibrous elements very much more developed than at any other part. The gland tubes are here lined entirely with columnar epithelioma, whereas towards the cardiac end the deep part of the gland is occupied by flattened and granular nucleated cells. Thus, as it is generally admitted now that the difference between scirrhus and medullary carcinoma consists chiefly in the much greater quantity of fibrous stroma which the hard scirrhus possesses, and the much larger number of cells which the soft medullary contains, if we consider the difference in structure of the pyloric orifice of the stomach to that of the mucous membrane adjoining it, we can well understand that the one form of cancer may easily pass into the other. Then, again, I am inclined to doubt if what is termed villous carcinoma is anything more than examples of squamous and columnar carcinoma presenting a papillary surface.

Seat.—As has been suggested, it is the orifices of the viscus, but especially the pyloric orifice, that the disease has the chief tendency to attack; and here we usually find the scirrhus or hard spheroidal-celled carcinoma, while the medullary and colloid varieties are found more frequently in the other parts of the viscus. Out of 1,848 cases of gastric cancer collected by Dr. Habershon, Dr. Brinton, Dr. Welch, and Dr. Luton, the pylorus was affected in 1,110 instances, or at the rate of 60 per cent.

	Dr. Habershon.	Dr. Brinton.	Dr. Welch.	Dr. Luton.
Pylorus	41	219	791	59
Lesser curvature	11	38	148	....
Cardia	10	36	104	8
Anterior wall	5	11	30	2
General	4	13	61	1
Centre	4	4	....	....
Multiple	1	....	45	....
Greater curvature....	1	11	34	2
Cardia and pylorus	1	....	....	....
Not stated	1	17	....	7
Posterior surface	....	11	68	3
Fundus	....	....	19	....
Total	79	360	1,300	82

From the above Table it will be seen that the disease was situated in the pylorus in 1,110 cases, at the lesser curvature in 197 cases, and at the cardia in 158 cases; or at the rate, respectively, of 10 per cent. and 8·6 per cent.

Carcinoma of the pylorus very rarely attacks the duodenum, but has a great tendency to extend in the mucous and submucous coats of the stomach, where it takes on the character of medullary cancer. The disease, when situated at the cardia, on the contrary, more frequently extends into the œsophagus.

The most common form in which the disease is found is in more or less of a complete ring, sometimes extending completely round the organ; at others only partially. This form is usually met with at the pylorus or cardiac orifice. Next in order the disease presents itself as a soft fungating tumour, springing from the pyloric end and along the lesser curvature, more rarely, as diffuse cancerous infiltration, arising from the fundus or mucous membrane generally. Occasionally the new growth becomes disintegrated, forming an ulcer with a smooth and almost level appearance. In such cases the true nature of the disease is only proved by secondary growths which appear in other organs.

When existing in the form of circumscribed tumours, they may present a broad and flattened mass, springing from the surface, sometimes as a fungoid growth, but usually of round or oval shape. More rarely, the disease is found as an irregular crater-like ulcer, with thickened, prominent walls, and jagged floor, the free surface presenting a cauliflower appearance which characterizes the so-called villous cancer.

When in connection with the orifices (which may have undergone reduction of, or increase in, diameter), the disease occasionally spreads to the duodenum or the œsophagus. The fundus is very rarely the seat of primary cancerous disease. Out of the 1,821 cases reported, it was only found in 19 cases in the fundus; but it may, and occasionally is, attacked by the encroachment of the disease from neighbouring parts.

Cancerous disease may be secondary to ulceration, or to fibrous stricture of the pylorus, but it usually begins as a primary growth.

It is extraordinary that the disease, once being present, does not extend much more quickly than it does. But the mucous membrane appears to possess a remarkable power of resisting the encroachment of the disease. The muscular, mucous, and submucous coats become infiltrated, and the disease spreads between them very much more quickly.

Cancerous masses here penetrate by means of the connective septa between the muscular bundles, which often increase much in size. The whole muscular coat speedily becomes replaced by cancer, which now spreads into the subserous connective tissue, invading the serous coat; then adhesive inflammation takes place between it and the adjoining structures, and the disease often extends to the peritoneum, or ulcerates into some neighbouring organ, as will presently be shown.

In the majority of cases the remaining tract of mucous membrane exhibits no particular alteration, with the exception of active hypertrophy; evidences of inflammation, softening, and attenuation on the one hand, grey discolouration, hardening, and ulceration on the other, are commonly wanting. They may, and do, however, exist.

The cellular structure of the organ (submucous, intramuscular, and submuscular) undergoes very marked thickening; at least this appearance is produced by the abundant development of filiform and cell structure in this situation. Amid this new formation cell development actively advances. While these changes take place in the coats of the viscus, the muscular coat becomes, in many instances, hypertrophied, and has been known to attain great thickness. It at the same time grows paler, less elastic, and more friable than natural. Occasionally, however, attenuation and almost complete atrophy of these coats are observed.

The size of the organ varies exceedingly; in some cases the viscus is so much enlarged that the great curvature has been known to almost reach the pubes; while in other cases it is contracted and singularly reduced in bulk and capacity. These differences in size are connected with variations in the locality of the disease, and the state of the orifices of the stomach. When the body of the organ is alone affected, the general bulk commonly remains unchanged. If the disease implicates and causes narrowing of the pylorus, enlargement ensues; if the cardiac orifice undergoes contraction, diminution of volume results. Another well-ascertained fact, that in cases where the pyloric orifice being dilated the walls of the stomach become hypertrophied, is not so readily intelligible.

Ulceration occurs in all forms of the disease, but more commonly in the medullary and cylindrical-celled cancers; this ulceration is the result of fatty degeneration and molecular disintegration of the surface, or of separation of a sloughing mass. The softer the growth the more extensive the ulceration is. These ulcers are usually round or oval in shape; or they may be irregular from the coalescing of two or more other ulcers. The edges are usually high, soft in consistence, the floor sloughy and friable, with warty growths scattered over them; both of these conditions may, however, be altered, and the ulcer present hard and smooth edges and base. In scirrhus these ulcers are much more superficial than in the soft varieties.

When once ulceration has commenced, it extends most rapidly in both the superficial and deep structures; the peritoneum may be perforated, and effusion of the peritoneal cavity follow; this, however, is a comparatively rare occurrence, as usually adhesive inflammation takes place between the surface of the peritoneum overlying the ulcer and the corresponding surface of some other viscera, or the parietes corresponding to it. Among the most common organs to be thus affected are the liver and pancreas; the transverse colon is also not unfrequently perforated.

The mesenteric glands are early affected, and the other viscera in the abdominal cavity become secondarily invaded with the disease. The vertebræ have been known to be ulcerated by carcinomatous matter in some cases. The abdominal parietes also have occasionally been destroyed to a considerable extent by gangrene, the tumour protruding through the opening formed in this way.

The medullary and cylindrical-celled varieties grow very rapidly, quickly invading all the coats of the stomach, while scirrhus is of very much slower growth; usually commencing at the pylorus, it causes contraction and often entirely occludes that orifice.

Colloid cancer appears as a more or less uniform thickening of the walls of the viscus; all the coats are converted into a colloid growth containing patches of transparent jelly-like substance. Nearly the whole stomach may be invaded. It has a tendency to spread to the omentum and peritoneum, where it often forms a large mass of disease. This form rarely gives rise to metastasis in distant internal organs. It may, however, form a circumscribed tumour projecting into the stomach.

The *etiology* of the carcinomatous disease of the stomach is much the same as that in other parts. Like cancer of the lip and tongue, the disease is more common in males than females, according to the authority of Drs. Brinton and Habershon, more than twice as many men being affected as women. Thus, in 223 cases collected by the former physician, 151 were males and 72 females, while in the 79 cases recorded by Dr. Habershon 52 were males and only 22 were females; while, on the other hand, of 1,303 cases collected by Dr. Wilson Fox, only 680 were males and 623 were females, showing, for all practical purposes, that the disease was about evenly distributed between the two sexes. Dr. Welch, in 2,214 cases, found males affected in 1,233 and females in 981 instances. We must conclude, therefore, that sex has not much influence on the disease.

Age.—Here, as elsewhere, the disease is found to exist very much more frequently after middle life than before; thus, in 74 cases reported by Dr. Habershon, 61 were over 40 years of age, and the great majority between the ages of 50 and 60. And Dr. Welch, in 2,075 cases collected from hospital statistics, and which he says were nearly all confirmed by post-mortem examinations, found much the same proportion.

	Age.							
	10–20	20–30	30–40	40–50	50–60	60–70	70–80	
Habershon ...	1	2	10	17	24	18	2	74
Welch....	2	55	271	499	620	428	140	2,075

Dr. Brinton's experience nearly tallies with this, although he found the larger number of cases existing between the ages of 60 and 70. His Table is as follows:—

	Age.							
	10–20	20–30	30–40	40–50	50–60	60–70	70–80	80–90
Brinton	¼	11⅔	31⅔	63	88	100	52½	60

The average age he states to be 51 years in men affected with cancer of the stomach, and in women 40½ years.

The existence of an ulcer or of a cicatrix from previous ulceration seems to produce a certain predisposition to the formation of carcinoma. For some time a predisposing influence has been ascribed also to chronic gastritis, which has been thought occasionally to terminate in scirrhus. In fact, it is undeniable that many cases of cancer are preceded by a long continuance of gastritis. Interesting in connection with this is the fact noticed by Waldeyer, that "in the most recently formed zones of cancer the tissues are almost as vascular and filled with heaps of white blood-corpuscles as it is in inflamed tissue." It is not difficult to see, therefore, how the exuberant nutrition and relaxation of the connective tissue might favour a rapid growth of epithelial cells.

Heredity and family taint has been most distinctly recognized in this disease. The family of Napoleon is said to be a case which exemplifies this in a most striking manner; himself, his father, and his sister Caroline are all reputed to have fallen victims to gastric cancer. To mental suffering and worry, is also frequently attributed the origin of the disease.

D'Espine observes that in his practice he has found the rich much more subject to this disease than the poorer classes. This may be accounted for by the fact that the rich as a body live to a greater age.

Symptoms.—The disease is usually ushered in by the ordinary signs of dyspepsia, the patient complaining of indigestion, with, in some cases, severe attacks of gastrodynia, and frequently pyrosis. Even in this early stage the patient presents a peculiar sallow appearance, and loses flesh. As the disease progresses vomiting becomes a prominent symptom; often the vomited matters are frothy and fermentous, and contain abundant sarcini ventriculi. The period at which this takes place varies according to the seat of the disease; frequently the food is rejected so quickly that it leads one to suppose the patient must be suffering from œsophageal cancer. The patient loses flesh rapidly, and from the constant attacks of severe sharp lancinating pains, wears a most anxious and haggard expression. The patient complains of excessive flatulence and frequent eructations of often a very offensive character. He may from time to time vomit blood, but this is not common in this stage of the disease, unless it be situated at the cardiac end of the stomach, or is of a very rapid growth. From this point the disease usually progresses very speedily, the symptoms become more and more severe, the vomiting more frequent, constantly of a coffee-ground consistency, the result of an admixture of blood with the contents of the stomach; the pain becomes most intense, and the patient speedily sinks. In this last stage the tumour, which may have been apparent before, decreases in size, and the vomiting may for a short time be relieved, this being due to the sloughing and breaking down of the diseased mass which has caused the obstruction; the growth being removed in this way, the vomiting may not be so frequent or severe. These symptoms often vary considerably. Occasionally there is no pain, but according to Dr. Brinton this occurs only in about 8 per cent.; Lebert, on the contrary, describes it as being absent in 20 per cent. Cases have been recorded, however, in which the disease was not suspected up to the time of death, and it was only discovered at the autopsy. These cases are, however, insignificant; and here general marasmus, or progressive anæmia and loss of flesh, or cachectic dropsy, are prominent symptoms. Cases such as these have frequently been mistaken for pernicious anæmia, occasionally for Bright's disease, morbus cordis, and phthisis. The above symptoms are never present when either orifice is affected, but only when the disease affects the greater curvature of the stomach generally.

The appetite in all cases is capricious, possibly more from the fear of the pain caused by the food than from actual disinclination to eat. The character of the pain varies, sometimes being described as a gnawing, burning, or dull heavy pain, at others most acute, lancinating, extending to the interscapular region, shoulders, and even to the liver. The tongue may be clean and moist, but usually, especially in the later stages, furred and abnormally red and dry at the edges. Towards the end of the disease aphthous patches are found on the tongue and buccal mucous membrane.

Rosenbach found fragments of cancerous tissue in the contents of the stomach, which he removed by means of the stomach-pump, and which he proved to be cancer by examining the fragments with the microscope. This, in some cases of doubt, might undoubtedly be a useful method to adopt for the purposes of diagnosis.

Van del Velden first noticed the absence of free hydrochloric acid in the gastric fluid of a patient suffering from cancer of the stomach. He found in eight cases in which he removed the contents by the stomach-pump from a dilated stomach the result of cancer of the pylorus total absence of hydrochloric acid; whereas in ten cases of dilation due to other causes, creating simple ulcer of pylorus, free hydrochloric acid was only temporarily absent. This test is not, however, always to be relied upon, as other observers, notably Kiebel, have found the acid present in cases of cancer.

Copious hæmorrhage is not common; when it does occur, it may be bright, or sometimes dark; some passes by the bowels, and is recognized in the stools.

Dysphagia is an important symptom of cancer of the cardia. Tumours can be felt in about 80 per cent. of the cases. Pyloric tumours, according to Dr. Brinton, are usually felt at the umbilical region in women, and the lower part of epigastric region in men. Percussion over the tumour is tympanitic, sometimes equal to the stomach, sometimes absolutely dull; occasional diarrhœa is present, and profound anæmia exists out of all proportion to the loss of blood—probably due to disease of blood-forming organs. Pulsation at the epigastrium is often a prominent feature of the case.

The patient may die from a variety of causes :—

1. Death may be the result of inanition and extreme exhaustion, caused by the patient being unable to assimilate food.

2. Septic pneumonia may hasten dissolution, caused by the absorption of septic matter from the sloughy ulcerated surface, the patient becoming in a low typhoid condition.

3. By the extension of the disease to secondary organs and parts. The liver is usually early affected in this disease. The mesentéric glands, spleen, and kidneys are also frequently the seat of secondary mischief. Adhesive peritonitis often takes place between the diseased stomach and some part of the neighbouring bowel, most frequently the transverse colon; in this case, food taken into the stomach escapes directly into the colon, and can be recognized as it passes in an undigested state with the stools. Fæces may, if the opening be large, pass from the colon into the stomach, and fæcal vomiting result; this is most frequently the case when the disease is situated near the pylorus. Much depends here upon the size of the opening; if small, flatus only passes into the stomach, causing much distress on account of the horribly offensive eructation that ensues of a fæcal odour.

Another method of diagnosing this accident is to inject coloured fluid into the rectum, when it is often ejected by the mouth. The peritoneum is not commonly perforated by the disease. Dr. Brinton, in 507 cases, only found this condition in 17 cases, or at the rate of 3·5 per cent. Various fistulous openings are much more common. Thus, in 160 cases reported by Dettrich, gastro-colic fistulæ existed in 6. In Dr. Brinton's 507 cases, 11; and M. Lange found it in 8 cases out of 210.

Peritonitis may cause adhesion of the parietal and visceral layer of peritoneum over the diseased part of the stomach, in which case it not unfrequently happens that the ulceration is continued through the parietes, and a fistulous opening established with the stomach, opening externally on the abdomen. Fistulæ less commonly exist between the stomach, and also the pleuræ, large and small intestines.

4. Hæmorrhage, although somewhat rarer than the above causes, is by no means an uncommon cause of death, the splenic and other large arteries being occasionally ulcerated into.

In cancer of the stomach the mesenteric glands in the neighbourhood of the viscus are nearly always affected; the liver also is usually found to be the seat of secondary deposits. The glands in the anterior and posterior mediastinum become affected later on, and frequently the lungs are the seat of cancerous deposits. The spleen, peritoneum, and kidneys, are not so constantly affected, although it is not at all an uncommon thing to find deposits in these organs.

Duration.—The duration of the disease seems to vary from a maximum of four years to a minimum of one month. Thus, Dr. Brinton found in his cases that the average length of time in which the disease lasted was twelve and a-half months, the longest time being thirty-six months, and the shortest one month. Lebert's cases gave an average of fifteen months, with a maximum of four years; 4 per cent. were under three months; 62 per cent. between six and eighteen months; 42 per cent. between six and twelve months; 17 per cent. between three and six months; and the same proportion between eighteen months and four years. Upon the conclusions of these two observers I think we may thoroughly depend ; we may safely say, therefore, that the average duration of the disease is between six and eighteen months.

Diagnosis of cancer of the stomach is not always by any means easy, as the symptoms resemble those found to exist in gastrodynia and chronic ulceration of the stomach. In the early stages it is well nigh impossible to distinguish for certain between them.

Patients with cancer lose flesh rapidly. They suffer from languor and excessive bodily weakness ; their expression is that well-known fawn-yellow colour accompanying the cancerous cachexia. Despondency and moroseness of temper are peculiarly remarkable in cases of cancer of the stomach, and is more marked when the disease occupies the cardiac end. Hypertrophy of the lymphatic glands in the supraclavicular region of the neck is of the greatest significance, when present, in determining the character of the mischief in the stomach, as in cancer alone do these glands become affected. To distinguish these different forms I cannot do better than arrange the symptoms after the manner adopted by Dr. Walsh in his treatise on cancer.

Gastrodynia.	Chronic Gastritis or Gastric Ulcer.	Gastric Cancer.—Early Period.
Tongue variable ; but often pale and pitted at the edges	Tongue dry, red, contracted, smooth, shining ; or saburral.	Tongue pale or natural.
Eructation frequent, of air without disagreeable smell.	Eructation not a prominent symptom.	Eructation of air more or less fœtid, sometimes horribly so, a prominent symptom.
Appetite depraved, irregular, capricious.	....	Appetite diminished, or even totally suppressed.
Sensations sometimes of heat, sometimes of cold, in stomach ; thirst not common.	Sensation of heat in stomach ; thirst.	These symptoms not observed.
Solids more easily digested than liquids.	....	Liquids more easily digested than solids.

Gastrodynia.	Chronic Gastritis or Gastric Ulcer.	Gastric Cancer.—Early Period.
Though the labour and suffering of the process be great, digestion is completed in the end.	Digestion imperfectly completed.	Digestion not properly effected.
Pain variable; occurs in irregular paroxysms; is often relieved by ingestion of food or pressure.	Epigastric pain not very severe and scarcely ever felt, when the stomach empty; is increased by pressure.	Epigastric pain may be agonizing; the lancinating character sometimes marked; often increased by pressure.
Epigastric pulsation not uncommon.	Is not observed.	Is not observed.
Never runs a completely latent course.	Never completely latent.	May for a variable time be completely without local symptoms.
	Vomiting of sudden and severe character sometimes the very first symptom; occurs irregularly before or after eating.	Vomiting of sudden and severe character is never the first symptom; it occurs generally early in the morning, subsequently at variable periods after eating, or at periodical intervals.
Vomiting of coffee-ground - looking matter does not occur, unless from accidental and rare hæmatemesis.	Coffee - ground - looking matter sometimes vomited; but this is rare and exceptional.	The matters vomited are at first glairy, then half - digested food, then coffee-ground or soot-like.
Bowels generally constipated, but not obstinately so.	Irritation, colic, and diarrhœa frequent from extension of inflammation to intestine.	Bowels habitually and obstinately constipated; occasional severe diarrhœa.
Febrile action accidental and rare.	Evening fever not uncommon.	Fever absent.
In females the chlorotic tint is often present.	Violent discolouration of the lips, conjunctivæ, and face, &c., often present.	Straw-coloured tinge of skin may be obvious.
Often accompanied with various nervous or hysterical symptoms.	Not so attended.	Not so attended.
Hypochondria occasionally present.	Hypochondria is not caused by chronic gastritis.	Hypochondria is not among the effects of gastric cancer [?].

Gastrodynia.	Chronic Gastritis or Gastric Ulcer.	Gastric Cancer.—Early Period.
Is more frequent than the other two affections.	Is rarer even than cancer.	Is much more rare than gastrodynia.
Is more common in women than men.	Is of equal frequency in both sexes probably.	Occurs more frequently in men than women.
May exist in very young persons (*e.g.*, æt. 15).	Occurs at all ages.	Is excessively rare before æt. 30.
Is often hereditary.	Is not hereditary.	Occasionally runs in families.
Is rarely referable to any distinct local exciting cause.	Is often referable to some distinct local exciting cause.	Is rarely, if ever, referable to logical agencies.
Is relieved or cured by stimulant, tonic, and anodyne treatment.	Is relieved or cured by antiphlogistic treatment.	Is not cured, but is relieved, by special treatment.

"But although this array of distinctive characters looks most satisfactory on paper, it must be confessed that, even after due consideration of them all at the bedside, doubt will sometimes still remain in the observer's mind. As cancerous disease advances, as the epigastric region becomes the seat of tension and of gurgling noise under pressure, as the patient vomits periodically profuse quantities of the coffee-ground matters, the diagnosis becomes more and more certain. In the great majority of instances, such a combination of symptoms and signs would warrant a decisive assertion of the presence of cancer; but exceptional cases do certainly occur (and I have both seen and known of such myself) proving that this very combination may arise, though no cancer exist; cases showing that the diagnosis is not absolutely certain, unless in addition *tumour* be discoverable. The simple chronic ulcer of the stomach, follicular ulceration, and simple exhalation of blood from the gastric surface, may all of them give rise to the vomiting of matters similar to those ejected in cases of cancer. A woman (whose history is preserved in the collection of University College) had cancer of the uterus, and vomited bloody matters occasionally. Did the fact of cancer existing in the uterus increase or diminish the chances that the hæmatemesis was produced by similar disease in the stomach? If in one obvious point of view it apparently increased those chances, it diminished them on the score of the excessive rarity with which the uterus and stomach become cancerous in the same individual. Be this as it may, the sole morbid change in the stomach was follicular ulceration. As a general fact, hæmatemesis is less valuable as a diagnostic sign of cancer in females than in males. Blood may gravitate into the stomach from the nares or mouth, and subsequently produce a sort of pseudo-hæmatemesis."

Hæmorrhage may arise either from erosion of small or large vessels, or from vascular congestion induced by the growing tumour.

But the most certain diagnostic sign we have is undoubtedly to be found in the vomited matters, sarcinæ, mucus, and occasional *cancerous* particles; the latter are most difficult to find, on account, no doubt, of their being subjected to the action of the gastric juice, and therefore the difficulty in recognizing them under the microscope. Next in importance in a diagnostic point of view is the finding of a tumour in the epigastrium; this, however, is not always present, or, if present, to be discovered early, on account of the relation of the stomach to the parietes. In the case of pyloric cancer, however, the tumour can be more readily distinguished as it becomes lower in position. The position of the tumour varies according to the situation of the neoplasm, and also according to the state of distension of the stomach, because during digestion the stomach revolves on its longitudinal axis.

If, therefore, a patient over 45 or 50 years of age presents himself with the symptoms detailed, and a tumour is found in the situation of the epigastrium, you may pretty safely diagnose gastric carcinoma.

It is often most difficult to diagnose carcinoma of the stomach from simple dilatation, and many tumours, as aneurism of the aorta or cœliac axis, hydatid or other tumours connected with the liver or omentum; enlarged mesenteric glands; accumulation in the viscus itself, such as hair, &c.; disease of the pancreas; accumulation in the transverse colon; distended gall-bladder; and floating kidneys; and it is only by strict attention to the symptoms and most careful examination that many of these diseases can be distinguished. I have known abdominal sections to have been made, the surgeon expecting to find cancerous disease of the stomach, and has found the tumour to be caused by some of the above-named causes, and *vice versâ.*

Carcinoma of the abdominal aorta or cœliac axis does not cause the constitutional symptoms connected with cancer. Moreover, they are to be distinguished by the pulsation of the aneurism, which can be felt to be not only antero-posteriorly, as it would be in the case of conveyed pulsation by the aorta to a tumour pressing upon it, but also by the pulsation being concentric and equally felt all over the tumour.

Enlargement of the glands around the smaller curvature, disease of the pancreas, omentum, and transverse colon may be all diagnosed by the method of exclusion of the different symptoms which are peculiar to cancer of the stomach.

M. Leven has pointed out the great difficulty that is sometimes met with in the diagnosis of cancer of the stomach from simple dilatation. The so-called uncontrollable vomitings are present in both cases. To prevent these vomitings, M. Leven recommends that the patient should take solid food once a-day (150 gr. of meat), so as to avoid congestion of the mucous membrane. The rest of the alimentation consists of a litre and a-half of milk and six eggs in the course of the twenty-four hours. If, at the end of eight days of this regimen, the vomitings be stopped, it may be taken as certain that there is no cancer of the stomach. M. Leven has supported this view by the history of cases which he has treated in this manner, and which were cured.

A specimen was shown at the Pathological Society of a fistulous opening being formed from the gall-bladder to the pylorus by gall-stones, in which there was great thickening and almost complete stenosis of the pyloric opening, which presented many of the symptoms of cancer of the pylorus, and was diagnosed as such, but at the autopsy it was proved to be due to the cause mentioned.

Dissemination takes place, in the majority of cases of gastric carcinoma, in some part of the body; thus, in 1,120 cases, secondary deposits were present in 710, or 63·4 per cent. Dr. Welch gives the following Table, which shows the relative frequency in which the disease affects different organs:—

	Number.	Per cent.
Lymphatics	551	35·0
Liver	475	30·0
Peritoneum, omentum, and intestines	357	22·7
Pancreas	122	7·8
Pleura and lung	98	6·2
Spleen	26	1·7
Brain and meninges	9	0·6
Other parts	92	5·8
Total	1,730	

The abdominal glands were affected more frequently than any other, viz., in 32·5 per cent. of all the cases.

M. Lange in 210 cases found the supraclavicular glands affected in 4·3 per cent. These metastases are produced by the conveyance of the cancerous material along the lymphatic or blood-vessels. In some cases the Portal vein has been found to be completely occluded by cancerous deposits.

Treatment.—Cancer of the stomach is *incurable*, but much may be done to relieve suffering. Belladonna, conium, and condurango all exercise a strong palliative effect upon the disease;

the latest remedy suggested is the latter, and is recommended to be prepared as follows :—

℞	Cort. condurango.	℥ ss.
	Aquæ.	℥ xij.
	Macera horis xij.	
	Dein coq. ad.	℥ vi.

Cola S. Take one or one and a-half table-spoonfuls twice daily.

Under this treatment in a case of Friedrich's the indurated and tender tumours which were distinctly felt in the epigastrium, together with the glandular enlargement in the supraclavicular fossa, disappeared in a striking manner.

Riegel has given this drug a fair trial, and while he finds it exert no influence specifically upon the disease, he regards the drug as a powerful stomachic, calculated to relieve dyspeptic symptoms.

The most important point to attend to, however, is to relieve pain. This may be done to a certain extent by strict attention to diet. The diet, if there be much nausea, should be cold, as hot substances tend to excite vomiting. The different forms of beef peptones and juices may be tried. Nutritive enemata may at the same time be given, and, indeed, if the introduction of all foods into the stomach excites pain and vomiting, the patient must be fed for the time entirely by this means, small quantities of liquid food being again given by the mouth as the pain becomes easier.

Opium and morphia are, however, the chief drugs, more especially the latter, given in solution of cherry laurel water :—

℞	Morphiæ muriat.	gr. i ss.
	Aquæ lauro cerasi	ʒ v.
	Ft. mis.	

xv to xxx drops when required.

Morphia may also be given subcutaneously. Ice-bags over the epigastrium often exercise a marked effect, and are much appreciated by patients.

In cases of extreme dilatation caused by stenosis of the pylorus, the stomach-pump may be used with advantage.

Hæmatemesis, when excessive, may be checked by means of ice applied to the epigastrium and a piece to be sucked, at the same time injecting ergotine subcutaneously. To relieve pyrosis antacids, more especially bismuth, may be given with advantage.

℞	Bismuth carb.	gr. x.
	Glycerine.	♏ xxx.
	Liq. morphiæ.	ʒ i.
	Aquæ	℥ i.

Ut ft. mist. 4 hours.

Creosote or carbolic acid in half-drop doses made into a pill often exercise a marked effect. Powdered charcoal may be used for the same purpose, especially when the pyrosis is accompanied by fermentation.

In the more serious complications our sheet-anchor must be opium and ice. Of late years surgeons have had their attention directed to this disease, and, stimulated by the admirable results following ovariotomy and the advance of abdominal surgery, M. Péan, in 1879, in a case of cancer of the pylorus, opened the abdominal cavity and removed the disease, stitching the duodenum and remaining portion of the stomach together with catgut sutures. The patient died on the fourth day.

The patient was a man suffering from cancer of the pylorus, and was, at the time of the operation, in the last stage of cachexia, he not being able to retain any food in his stomach, and having to rely almost entirely on nutritive enemata for sustenance, which, as usual, were found to be insufficient, applied to M. Péan to take some operative measures to relieve him, or, if nothing could be done, he was determined, he said, to put an end to his life. M. Péan, rather reluctantly, agreed to comply with the entreaties of the patient and his relatives, and decided to attempt an operation. An incision, about ten centimètres in length, was made on the left side of the umbilicus and parallel to the linea alba. When the peritoneum was opened the stomach was found to be considerably dilated, extending downwards as far as the pubic arch. Its walls were greatly hypertrophied. The peritoneum did not seem to be affected in any great degree. The pyloric portion of the stomach was then gently drawn forwards, when it was found that the growth measured six centimètres transversely and four in a vertical direction. The whole of this mass was excised, as was also a portion of the epiploon, which was diseased. The two surfaces of section were then drawn into contact by means catgut sutures. No liquid of any kind was allowed to enter the peritoneal cavity during the operation. The abdominal wound was closed in the ordinary manner. The operation lasted two hours and a-half. For the first two days after the operation the patient was fed by the rectum, but on the third day some food was allowed to be introduced into the stomach. During the first three days the pulse remained alarmingly weak; consequently it was decided to perform transfusion. Fifty grammes of blood were introduced into the median cephalic vein on a first occasion, and subsequently eighty more were injected. Unfortunately his condition did not improve, and he died on the night of the fourth day. He had shown no signs of peritonitis during these four days. It is much to be regretted that it was not possible to obtain permission to perform a necropsy, as it would have been highly interesting to see what had become of the catgut sutures, and to know whether the intestinal wound showed any signs of uniting.

Billroth, of Vienna, in 1881, excised about six inches of the greater curvature of the stomach and pylorus for infiltrating cancer; the patient was a woman aged 43. The operation lasted one hour and a-half. There was extensive adhesion to the omentum and colon. Fifty silk sutures were used to unite the duodenum with the remaining portion of the stomach. The patient was alive a week after the operation, and the sutures were removed from the outer wound, which had healed by first intention.

In the "Wiener Medizinische Wochenschrift" of the 5th February, 1881, the following case is reported by Professor Billroth. The previous week, a woman was brought to him having unmistakable symptoms of pyloric cancer. The patient, who was 43 years of age, and mother of eight children still living, was attacked, apparently somewhat suddenly, with vomiting in October 1880. All the symptoms of pyloric cancer soon developed themselves; and Billroth determined, with her consent, to operate, as she felt herself sinking under the increasing exhaustion and inability to retain food. The tumour lay on the upper side of the stomach and somewhat to the right; it seemed to be about as large as a moderate-sized apple. A transverse incision, about 8 centimètres (3 inches and one-fifth) in length, was made over it through the wall of the abdomen. The tumour was difficult to disengage, on account of its size; it presented itself as a partly knotty, partly infiltrated cancer, covering the pylorus and rather more than a third of the under part of the stomach. Billroth loosened the adhesions to the omentum and the transverse colon, separated carefully the greater and lesser omentum, and tied all the blood-vessels before cutting them through; the loss of blood was very slight. He then made an incision through the stomach one centimètre beyond the infiltrated part, at first in a backward direction only, and afterwards through the duodenum. Six sutures were then passed through the lips of the wound, the threads being left untied and only used to keep the lips of the wound in position. He then made a further oblique incision into the stomach from within and above in an outward and downward direction, keeping always one centimètre from the infiltrated part of the wall of the stomach, and then closed this oblique wound, from below upwards, until an aperture was left just of a sufficient size to fix the opening of the duodenum. The separation of the tumour from the duodenum was completed by means of an incision parallel to that in the stomach, and always at a distance of a centimètre from the infiltrated part. The duodenum was then introduced into the opening of the stomach which had been left. Altogether about fifty sutures were made with Czerny's carbolized silk. The wound was washed with dilute carbolic acid, and a few additional sutures inserted at weak points, the whole replaced in the abdominal cavity, and the abdominal wound closed and bandaged The operation lasted an hour and a-half. No weakness, vomiting, or pain followed the operation. During the succeeding twenty-four hours the patient took only ice by mouth, and nutritive injection with wine; on the following day a table-spoonful of sour milk every half-hour. The patient, a very intelligent woman, felt very well, and slept most of the night by help of a small injection of morphia. The piece excised was 14 centimètres (about 5½ inches) in length along the greater curvature of the stomach. Only a quill could, with difficulty, be passed through the pylorus. The shape of the stomach is not much altered by the operation, but somewhat reduced in size. The seventh day after the operation the sutures were removed from the parietes, the wound healing without any reaction; the general condition of the patient good; she takes broth and egg, coffee, tea, and cocoa.

In a second case of resection of the stomach, performed by Billroth, unfortunately, the patient died on the eighth day after the operation, from inanition. Milk, coffee, soup, wine, and various forms of solid food, especially meat and biscuits, freely divided and in various combinations, were tried as food; but nothing remained longer than three or four hours in the stomach, being then vomited, mixed with gastric juice and tinged with bile. As symptoms of peritonitis were entirely absent, the vomiting could be traced only to mechanical obstruction to the passing of the contents of the stomach into the duodenum. At a meeting of the Vienna Medical Society, Billroth expressed the opinion that there must have been a kind of bend in the passage from the stomach to the duodenum, by which the transit of the food was made difficult. Another important fact noted was that the stomach, having been previously much dilated, would scarcely have sufficient power of contraction to overcome this obstruction. The action of the stomach was also considerably impeded by peritoneal adhesions to surrounding parts, especially the abdominal wall. These considerations induced Billroth to reopen the wound six days after the operation, in order either to remove an existing mechanical obstruction, or to form a duodenal fistula, through which the patient might be temporarily fed. Billroth opened the stomach for the second time, under anæsthetics, and found it very much dilated and fixed, not only within the sphere of the former operation, but also higher up towards the diaphragm. The passage into the duodenum was free, but bent. As a fresh and complete suture of the stomach would have taken too much time, and, moreover, was not advisable in the lowered state of vitality of the patient, the abdominal wall was fixed to the opening in the stomach by a few sutures; and a drainage-tube, about the size of a finger, was placed in the duodenum for the introduction of food. This arrangement answered well; but the patient, who, since the operation, had been nourished only by enemata, was past recovery, and died from exhaustion thirty hours after the second operation. The necropsy confirmed the observations made during life. Signs of general peritonitis were entirely absent. This second case, as well as the first, teaches that the operation of resection of the stomach carries with it as little danger of general peritonitis as any other laparatomy, carried out under strict antiseptic precautions, without spray. It appeared further, from the necropsy, that the extirpation of the cancer was complete. The mesenteric glands were intact. With respect to the mechanical cause of death, this case is prospectively instructive, especially in cases where the stomach is dilated. These two cases of Billroth's have constituted a precedent for this serious operation; but much labour and experience will be necessary before recovery after resection of the stomach can be expected to take place with as little anxiety as after ovariotomy. The first patient operated on by resection of the stomach is at the present time in perfect health.

Since the above cases, the operation has been repeated several times; in thirty-seven cases that have been published as having been performed by different surgeons, twenty-seven died from the immediate effects of the operation. Czerny has performed the operation in six cases, four of which were pylorectomies; two cases died as the immediate cause of the operation. Billroth in eight cases has had three fatal results. He further says, out of fifty or sixty cases he has examined, only one appeared which was suited for operation.

This operation has not met with much favour in this country. Mr. Southam was the first, I believe, to perform excision of the pylorus in England on the 5th April, 1881, at the Manchester Royal Infirmary. The patient was a man, aged 43, from whom Mr. Southam removed the pylorus, along with nearly a third of the stomach, suffering from carcinoma of the parts which were taken away by operation. The patient had been under the care of Dr. James Ross for the relief of symptoms of pyloric obstruction. A hard and freely movable mass could be felt through the abdominal walls; and operative measures were determined upon at Dr. Ross' suggestion. The operation was performed by Mr. Southam, with the assistance of Mr. Whitehead, antiseptically, after the method adopted by Professor Billroth. Thirty-nine silk ligatures were found necessary for uniting the duodenum to the stomach. The shock succeeding the operation, which lasted one hour and a-half, appeared to be very slight, and for twelve hours the patient's condition was all that could be desired. No sickness ensued; the pulse was very fair; and the temperature did not fall below 97·6°. Towards evening the temperature rose gradually; and, fourteen hours after the conclusion of the operation, death occurred somewhat suddenly, apparently from collapse, but "no doubt," in the opinion of the operator, "as the result of that acute form of septicæmia, or rather septic intoxication, to which Dr. Marion Sims has directed attention, and which is, no doubt, the real cause of death in many cases of abdominal surgery, especially where no outlet is afforded for the discharges." The temperature just before death had risen to 102°. At the necropsy, the condition of the parts around the seat of operation was carefully examined, and tolerably firm adhesion was found to have already taken place between the cut surfaces of the stomach and the duodenum. There were six and a-half ounces of blood-stained serum in the peritoneal cavity.

For the operation to be justifiable, the tumour must be distinct, circumscribed, perfectly movable, and free from all adhesion. If such a case presented itself, the surgeon, if quite sure of his diagnosis, might be justified in recommending an operation for the removal of the growth.

Wölfler has proposed forming a fistulous communication between the stomach and small intestine in extreme cancer accompanied by stenosis of the pylorus. The operation, which he has named gastro-enterostomy, has been performed six times only; two, however, survived the operation. Three cases have since been operated on in this country, one by Mr. Reeves, one by Mr. A. Barker, referred to later on, and one by Mr. Thomas Morse, which died thirty hours after the operation. (Brit. Med. Jour., Mar. 13, 1886.)

Gastrostomy in cancer of the cardiac end of the stomach has been practised in seventy-six cases, out of which only fourteen lived over thirty days after the operation, so that the results cannot be said to be encouraging.

Our experience must considerably increase, and the results of the operation be very much better, before I can think that we are justified in subjecting patients to the formidable operation of pylorectomy; for although it is true Wölfler has shown a case in which he had resected the pylorus with a portion of the stomach alive and well eight months after the operation, yet, as Billroth has pointed out, the percentage of cases in which he considered the operation justifiable was only 1·75 per cent., and of those cases in which the patients were operated on, only 7·3 per cent. recovered from the effects of the operation, while, of the survivors, a very few lived a sufficient length of time to warrant him in asserting that it is an operation to be commended.

Gastro-enterostomy.—Winiwater, in a case under his care in which he found it impossible to remove the diseased pylorus, performed gastro-enterostomy. This consists of drawing up the third part of the duodenum and establishing a fistulous opening between it and the great curvature of the stomach. In his first case the operation was successful, and gave great relief to the patient.

Mr. Barker has recently performed this operation successfully on a woman, aged 37, suffering from pyloric cancer. Mr. Barker adopted the median incision, and united a part of the jejunum, as near as possible to its origin from the duodenum, to the stomach. The patient made a good recovery, and was quite relieved from all pain and discomfort. (*Vide* Case XI appended.)

Billroth, following Winiwater's suggestion, has performed the same operation, but goes a step further by removing the cancerous disease by a second operation; without attempting to unite the cut ends of the stomach and duodenum, he simply closes the divided ends, so that the end of the duodenum remains as a kind of continuation of the common bile-duct, and no longer a canal for the passage of food. The patient upon whom he performed his operation was doing well five weeks after the operation.

Jejunostomy.—This has been performed twice by London surgeons. The object of the operation is to open the intestinal canal below the seat of disease, and on account of the lesser risk to the patient it is likely to be preferred by many surgeons to *gastro-enterostomy*, and certainly to *pylorectomy*.

The recommendations to this operation are the ease with which it can be performed, involving comparatively little danger to life, and possessing the advantage of securing, as far as possible, rest to the stomach and the introduction of food into a part of the alimentary canal where digestion and absorption are very active. Such are the advantages claimed for jejunostomy, as set forth by Mr. Pearce Gould, the surgeon who was the first to practise it in this and, I believe, in any country. The patient on whom he operated, as well as one on which Mr. Bird performed the operation, both died, the former from exhaustion caused by the disease, the latter by inadvertence on the part of the nurse in forcing the feeding-tube alongside of the intestine into the peritoneal cavity instead of into the opening in the jejunum.*

Operations.

Pylorectomy.—The operation for excision of the pylorus is conducted thus: The patient having been prepared by only having had liquid food for six days immediately before the operation; the stomach must be thoroughly cleansed by means of the stomach-pump with tepid water. The incision may be transverse or oblique, in a direction placed over the tumour, and free enough to expose the parts thoroughly. I think, however, it is better to make the incision in the middle line from the xiphoid cartilage to the umbilicus. In Billroth's cases the incision was four or five inches long, crossing the middle line above the umbilicus. The large and small omentum must be carefully separated from the parts to be removed, all bleeding vessels being tied as divided. The pyloric part of the stomach is then drawn out of the wound and laid on a carbolized cloth, or a flat sponge, the subsequent steps of the operation being conducted outside the cavity.

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* Clinical Society's Report, vol. xix.

The stomach and duodenum are then cut through with scissors. After each stroke of the scissors, any bleeding point is secured. Before dividing the duodenum a few threads must be passed through its serous and muscular coats, lest it slip back into the cavity of the abdomen. The duodenum is then fitted to the stomach by the removal of a V-shaped piece from its walls, either on the greater or lesser curvature, or at one side only. Finally, the stomach and duodenum are united by sutures inserted in two rows, one, an inner row, uniting the edges, and the other outer row bringing the serous peritoneal coats into close apposition, as adopted by Czerny.* The stomach is then returned into the abdomen, and the wound closed. Fifty or sixty sutures are required, and the operation in Billroth's hands occupied from one to two hours.

Jejunostomy.—The operation is performed by making any one of the following three incisions, viz.: 1. An incision extending from just below the xiphoid cartilage to within half-an-inch of the umbilicus. 2. An incision, about three or four inches long, made parallel to, and about two finger breadths from, the false ribs on the right side. 3. An incision along the left linea semilunaris. The second incision is probably the best, as it involves less displacement of the omentum.

The finger being introduced into the wound, and the great omentum pushed on one side, the upper end of the jejunum is easily found. This is now drawn into the wound, and fixed to it by a double row of carbolized silk sutures; the upper and lower ends of the wound are then approximated, and carefully united.

The sutures should be so placed that the part of the intestine presenting in the wound is that portion exactly opposite to the mesentery. Great care must be taken not to put traction upon the bowel and mesentery, but to choose the highest part of the bowel that can be easily brought into the wound.

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* *Vide* p. 234.

The opening in the bowel should not be made until the fourth or fifth day, and the after-treatment should be the same as that described for gastrostomy.

Gastro-enterostomy.—Preparatory to the operation the stomach must be washed out two or three times the day previous to, and again about two or three hours before, the operation, with warm water, by means of the stomach-pump. The patient being placed under the influence of an anæsthetic, an incision is made in the middle line from just below the xiphoid cartilage to the umbilicus. All vessels that may bleed should be clamped at once before opening the peritoneum. The peritoneal cavity being opened, the surgeon, introducing his finger and pushing the omentum on one side, catches the first part of the jejunum and draws a loop of it out of the incision; the middle of the anterior part of the stomach is now also drawn through the wound, and the parts supported by sponges wrung out of warm carbolized water.

A piece of india-rubber tubing is now passed through the mesentery at each side of the loop of intestine to be opened, and having emptied the portion of gut between by gentle pressure, the ends of the tubing are drawn tightly enough to prevent access of the contents of the bowel into the loop to be opened. The plan adopted by German surgeons is now to open the stomach and jejunum to the extent they wish, after placing the jejunum upon the stomach to ascertain the exact position of the openings, and then uniting the cut edges by means of Czerny's suture. Mr. Barker in his case, however, adopted another course; he placed the empty loop of gut upon the portion of stomach to be opened, and a longitudinal fold of the latter about one inch and a-half from the great curvature was forced up between the finger and thumb of the left hand, together with the collapsed gut. He now made an incision about an inch and a-half long in the fold of the stomach, and another corresponding in the approximated fold of gut. These incisions only penetrated through the serous and muscular tissues, and left the mucous coat of both viscera intact for the while. Still holding the parts as before, between finger and thumb, he now united the corresponding posterior edges of the wound by a continuous suture, the needle entering and emerging in each case between mucous and muscular coats, and the threads crossing the cut edges of the muscular and serous coats. In this way the serous surfaces are closely united from end to end before either viscus is opened.

This row of stitches (which are about an eighth of an inch apart) is to be carried about a quarter of an inch beyond each end of the incision in the coat of the bowel. The mucous membrane of the stomach and intestine is now to be opened to the full extent of the incision by means of scissors, and any fluid that may escape caught by sponges. The anterior borders of both openings are now to be united by a row of interrupted sutures, introduced according to Czerny's method. The two openings being now securely closed, the intestine is turned over and the posterior suture reinforced by a second row of interrupted sutures, placed about a quarter of an inch from the first. The anterior row is to be then similarly strengthened by a row of continuous sutures passing through only the serous and muscular coats. Unless there should be any kinking, as has occurred in some cases, the effluent end of the gut is to be stitched to the stomach wall, about three-quarters of an inch from the right extremity. The replacement of the viscera and closing the external wound now completes the operation. The wound should be dressed with salicylate wool.

After all these operations, the patient should be fed by means of peptonized enemata every six hours, and only small pieces of ice by the mouth for the first week after the operation.

CHAPTER VIII.

CANCER OF INTESTINAL CANAL.

Carcinoma of the intestines may appear either as a primary or secondary growth. The former is most frequently found in the colon and rectum; the latter is always the result of metastasis from some neighbouring part.

As the rectum will claim our special study presently, I shall only allude to it now.

The varieties of cancer found in the intestines as primary growths are much the same as those found in the stomach, viz., adeno-carcinoma, cylindrical epithelioma, colloid, scirrhus, medullary, and alveolar and lympho-sarcoma.

Dr. H. von Ziemssen, in his "Cyclopædia of the Practice of Medicine," gives the following extract from the Reports of the K. K. Allgemeine Krankenhaus at Vienna of the statistical relation of carcinoma of the intestine:—

Out of 34,523 deaths at the hospital between the years 1858 and 1870, there were 1,874 cases of cancer of different kinds, equal to 5·4 per cent., a number that agrees with those recorded at Geneva. Of 4,567 cases of cancer at the same hospital, 143 were of the rectum, and 35 of other parts of the intestine. The former were, therefore, 3 per cent., the latter 0·76 per cent., of the whole; the former 80 per cent., the latter 20 per cent., of all the cancers of the intestine. The Geneva list and London statistics agree entirely with regard to the number of cases of cancer of the rectum.

The published cases collected by this observer, together with the records of Pathological Institutes and Hospitals, give the following figures:—

	Cases.	
Cancer of the colon (exclusive of rectum)—		
Sigmoid flexure	42	
Descending colon	11	
Transverse colon	30	
Ascending colon	6	
	—	89
Cancer of cæcum		20
Cancer of appendix vermiformis		3
Cancer of ileo-cæcal valve		9
Small intestines—		
Duodenum and jejunum	17	
Middle portion of ileum	3	
Lower ditto	13	
	—	33
Total		154

These 154 cases of cancer of the intestine correspond (according to the foregoing) to 616 cases of cancer of the rectum; and we obtain, by a further calculation, the following proportions for cancer of the intestines in general: Cancer of the rectum, 80 per cent.; of the colon, 11·5 per cent.; of the cæcum (including the cæcal valve and vermiform appendix), 4·1 per cent.; of the small intestine, 4·3 per cent.

Opinions regarding the proportion of cancer of the intestines in males and females differ greatly, as the following Table shows:—

	Males.	Females.
Desault	1	10
Billroth	10	8
Bernard	20	23
Rokitansky	15	17

Thus, in 104 cases of cancer, 46 were in males, and 58 in females; but I fear no conclusions can be correctly drawn from this, as the experience of the several authorities differs so greatly.

I propose now to describe the disease as it occurs in different portions of the intestinal canal, dividing the tract for convenience into two parts, viz.: (1) The duodenum; (2) small intestine and colon (including the sigmoid flexure).

(1.) *Duodenum.*—The disease is found here much more frequently as a secondary deposit from some neighbouring organ than as a primary growth.

As a primary growth, carcinoma usually commences in the neighbourhood of the opening of the bile-duct. When present, it takes the form of a soft, fungating tumour, usually solitary, and with sharply-defined borders; or as papillary growths and excrescences, covering a considerable area. The walls become early infiltrated with cancer cells, are thickened and hypertrophied. If this extends around the whole gut, it becomes converted into a thick-walled rigid tube.

Most frequently the disease has commenced in the liver, pancreas, or mesenteric glands. Cancer, as has been before stated, when discussing carcinoma of the stomach, rarely exists in the duodenum as an extension of the disease from the stomach; sometimes, however, this is the case—that is, carcinoma of the pylorus has been known to extend onwards into the pyloric end of the duodenum. When the growth exists secondary to malignant disease of the liver, pancreas, or mesenteric glands, it is usually affected by adhesion of the peritoneal coats of the two organs, by which the disease spreads from the one to the other by direct contact.

Symptoms. — The earliest symptoms are usually very insidious, and resemble in many respects those of cancer of the pylorus, or hepatic disease. The patient suffers from dyspeptic symptoms and general uneasiness, after taking food, becomes low-spirited and morose; complains of nausea, with occasional vomiting. The patient rapidly loses flesh, and complains early of shooting, burning pains in the back and stomach. This pain increases greatly as the disease progresses, and is often aggravated at night, frequently extending down the sides, and even to the testicles in men. The complexion is of the peculiar fawn-yellow colour so characteristic of patients who are suffering from malignant disease of the stomach.

On *palpation* a hardness or distinct enlargement may be felt, about at a point corresponding to the cartilage of the tenth rib; it is very difficult to distinguish this from pyloric cancer, enlargement of the mesenteric glands, or disease situated in the pancreas; in disease of this organ, however, the enlargement is rather more central, the evacuations, as shown by Bernard, if the disease is so extensive as to stop the pancreatic duct, always contain fat, and the symptoms in the early stages are less pronounced.

In pyloric disease the vomiting is much more persistent than in cancer of the duodenum, and the vomited matter is more frequently mixed with blood.

As the disease progresses, ulceration takes place, accompanied by thickening of the coats of the duodenum, and adhesion may take place with the ascending or transverse colon, or at the junction of the two more frequently.

The difficulty of distinguishing between this disease and that of diseases of the omentum and liver is not so great, as usually tumours connected with the liver are situated in the right hypochondrium; and the surface of the organ can be felt, nodulated by the masses of disease which exist, the tumour moving very distinctly with inspiration and expiration. In cancer of the omentum the tumour is much more movable, and usually situated more in the centre, and the gastric symptoms are less marked. The tumour here is not affected by the respiratory movements.

Jaundice may be present if the disease extends to the bile-duct, or if the tumour presses upon that duct. Local abcesses occasionally form if perforation or sloughing takes place.

The patient as the disease progresses becomes more and more emaciated and cachectic, and very shortly sinks from exhaustion.

Treatment.—The disease is completely beyond the skill of either the physician or surgeon, and the only treatment to be adopted must be purely palliative. Opium or morphia, either by the stomach or subcutaneously, are the chief remedies at our command; conium, belladonna, and condurango may also be given with a similar intention, at the same time keeping the patient's strength up with nutritive enemata of peptonized beef tea, milk, eggs, port wine, or brandy. At the same time the patient should be fed with light, easily digested food, milk, oatmeal gruel, Brand's essence of meat, and the like; by these means the last weeks of the patient may be made fairly comfortable.

Intestines.—The intestines are very rarely the seat of primary cancer, but when so affected it is usually secondary to the disease existing in the muscular glands.

Primary disease here, I believe, invariably commences in the cylindrical epithelium of the Lieberkühian follicles, and extend downwards very much in the same manner in which they do in the glandular duct of the stomach, the muscular coats being pierced and the disease extending very rapidly in the submucous coat, and project directly into the lymphatic vessels. The characteristics are found here that have been noticed in the stomach, more especially the pyloric end of that viscus. The disease has, in both instances, a great tendency to spread around the circumference of the gut, forming an annular constriction; the calibre of the intestine thus becomes constricted, and the passage of fæces impeded: this may be the result of two distinct causes, viz., partly from projection of the disease into the intestinal tube itself, and partly by cicatricial contraction, which so generally attends the changes that the cancerous masses assume.

The disease, when existing as a primary growth, is usually found in the form of a small nodule or nodules, in different parts of the intestine, also as large flattened plaques caused by the infiltration of the submucous coats with the disease, and consequent thickening of the mucous membrane. (A good example of this is seen in the Museum of the Royal College of Surgeons, No. 2526. A portion of small intestine, with a raised rounded plaque of cancer projecting about an eighth of an inch above the mucous membrane, and five-eighths of an inch in diameter; its surface is broken and fissured, and its edges overlap the mucous membrane around its base of attachment.) As this increases, ulceration sets in, and a fungous mass will be found in the canal. Most commonly, however, the disease follows the course of the blood-vessels, and, as mentioned above, forms an annular constriction, which contracts more and more until a complete stricture of the gut may result.

When the obstruction is caused by the projection of cancerous disease into the gut, the calibre of the tube may be restored by the breaking down and sloughing of the mass or the disease extending, adhesive inflammation may take place between this and an adjacent portion of the intestine; ulceration taking place between the two portions, and an opening established whereby the passage for fæces may be formed from the portion of intestine above the disease to another portion below it.

The mucous membrane around the cancerous mass is often inflamed and indurated, the fibres of the muscular coat become separated and thickened, the subserous coat infiltrated with the cancerous disease, and the growth may project into the abdominal cavity, causing adhesion to the neighbouring parts; the peritoneum being perforated, and new growths set up in the neighbouring organs.

In the College of Surgeons Museum, No. 2531, you may see this well illustrated. It represents the stomach and colon with carcinomatous ulceration connecting them, opening into a large ragged surface between them, the walls of which are formed of cancerous material; the growth probably commenced in the colon.

When the intestine is thus diseased, the portion above the seat of disease becomes much distended, while that below the disease is quite contracted. The mucous and muscular coats are hypertrophied and thickened so as to form a distinct tumour, or an enlargement which can be, as a rule, distinctly felt through the parietes.

A good example of lympho-sarcoma is shown at the Royal College of Surgeons Museum by Dr. Goodhart (No. 2523 A). A considerable portion of ileum with great enlargement of Peyers patches from infiltration by lympho-sarcoma. They are exceedingly prominent, standing out quite free of the mucous membrane, with overhanging edges, and are of fleshy consistence. The rest of the mucous membrane and the solitary glands are apparently healthy.

During sixteen years, forty-five cases of stricture of the intestines have occurred at Guy's Hospital, as shown by post-mortem examination.

General narrowing from disease of the peritoneum extending to the coats of the bowel	2
Of small intestines	1
,, cæcum and ascending colon	2
,, hepatic flexure	3
,, transverse colon	2
,, splenic flexure	1
,, descending colon	4
,, sigmoid flexure	10
,, rectum	20
Total	45

The etiology of cancer of the intestines is very unsatisfactory. Probably mechanical irritation is the most common cause in a subject who possibly has an hereditary predisposition to the disease. Waldeyer, in Virchow's "Archives," mentions a case in which, a year after an operation for ovarian disease, cancer developed in the portion of intestines which had become adherent to the pedicle.

A somewhat similar case under my own care was that of a woman from whom I removed an ovarian tumour. She recovered from the operation, and died about fifteen months afterwards, with diffuse colloid cancer affecting the whole of the abdominal cavity. The case of Waldeyer points, I think, to direct mechanical irritation.

Cicatrices, caused by ulceration of the bowels, are said to be a not uncommon starting-point. A circumstance that rather points to this as an exciting cause is the fact of cancer of both the small and large intestines occurring chiefly at the flexures. This, as Baillie suggested, might be caused by the more marked development of glands in these parts, and in the greater susceptibility to injury by the passage of hard bodies at those points of the colon where it becomes contracted.

Age.—Cancer of the intestines is very rare before the age of 40 years; it is most frequent between the ages of 50 and 60 years. Occasionally the disease is found in young people.

Symptoms.—The symptoms of cancer of the small intestines are generally pain, at first occasional, dull, and heavy, but very early this pain becomes more acute, lancinating, and constant, often radiating to other parts of the body.

Anorexia is a very early symptom, accompanied by accumulation of flatus and irregular action of the bowels. Occasional fulness of the abdomen, disappearing as suddenly as formed, in some cases of extreme emaciation, exhibiting the outline of coils of intestine. Periodical vomiting, either of a bilious or simple mucous and glairy character. When complete obstruction occurs, this vomiting assumes a fæcal, stercoraceous character. The anorexia, although in many cases very marked, occasionally is absent, the appetite being well maintained. The patient loses flesh, œdema of the ankles sets in, and the skin assumes the well-known cancerous tinge. Some patients vomit at fixed periods after eating. This is more especially the case when the disease is situated high in the bowel. The presence of a tumour becomes sooner or later discoverable; and, when found, corroborates the diagnosis. Constipation increases, and is difficult to overcome. This, however, is sometimes alternated with violent diarrhœa. Hæmorrhage from the bowels does not take place very frequently, but is occasionally present. Even when the disease is situated in the small intestine, the fæces may be flattened and ribbon-like in shape when discharged, as we shall see is observed in cancer of the rectum.

The tumour, when present, is hard, somewhat uneven, and dully tympanitic on percussion. When situated over the large arteries, pulsation is transmitted to it. This tumour is always present, sooner or later, in the disease; and, as previously alluded to, on account of the accumulation of fæces above the obstruction, the tumour appears very much larger than the amount of disease corresponding to the size of the carcinomatous growth.

As the cancer progresses, if the patient does not succumb, disintegration of the growth takes place; rupture of the intestine may occur into the peritoneal cavity; or a fæcal fistula is formed by the disease ulcerating into the bladder, vagina, and, in rare cases, through the abdominal parietes.

In cases where these fistulæ occur, the more urgent symptoms, for a while, are improved. If the fistula opens into the bladder, fæces pass by the urethra; but speedily the bladder becomes filled with fæces, and the patient shortly dies. In like manner, when the fistula opens into the vagina, the fæces and flatus pass by this channel, and the sexual organs in both cases become coated with a mixture of fæces, urine, and the filthy discharge from the cancerous surface.

Death is either the result of general exhaustion, and occurs after full development of the cachexia, or may be produced by peritonitis following perforation into the peritoneal cavity;

or it may be the result of pyæmia, venous thrombosis, embolism, or some other rapidly fatal catastrophe. Ileus is another and not very uncommon cause of death in this disease.

Diagnosis.—The diagnosis of cancer of the intestines is most obscure. Even in cases where a tumour is discovered one cannot be too careful how one gives a definite diagnosis, as it is most difficult to distinguish between a cancerous mass and other tumours.

The tumours that may only be too easily mistaken for cancer of the intestines are tumours connected with the under surface of the liver, hydatids, tumours connected with the spleen and the kidneys, either malignant or otherwise, enlargement of the mesenteric glands, and encysted peritoneal exudation, typhlitis and peri-typhlitis when there is thickening of the tissues of the intestine or cellular tissue around it; some forms of ovarian tumour and extra-uterine fibroid may sometimes be difficult to distinguish, and, lastly, simple cicatricial contraction causing stricture. All these may be mistaken if care is not taken to weigh well the symptoms that are connected with the presence of each. As a rule, then, if a tumour is discovered in a patient above 50 years of age you must look upon it with suspicion, and if with this, all the symptoms narrated above are present, you may be pretty sure that the disease is malignant.

There is one other source of tumour in the abdomen which I think is far more difficult to distinguish than any of these, and that is, accumulation of fæces in some part of the intestines, whether this is purely a fæcal tumour, or whether the fæcal accumulation has gradually taken place above the site of an intestinal carcinoma. In both cases you may have all the symptoms of cancer—anorexia, loss of flesh, vomiting, occasional diarrhœa, the dull, heavy, sometimes sharp, lancinating pain, and vomiting occasionally of a stercoraceous character, the pinched, anxious expression of countenance—all these may be coupled with a tumour of variable size situated in some portion of the colon. I had a case of this kind under my care some few years ago. It was that of a lady, aged 55, who had a large tumour extending from the hypochondrium on the right side to the crest of the ileum; the tumour was fixed, tender on pressure, and dull on percussion. When I saw her she was in a complete state of collapse, countenance pinched, vomiting everything she took, great pain, and apparently sinking fast. I had not the least doubt but what she had cancer either of the liver or colon. I found she had been under the care of a London physician, who I suggested should be sent for. He arrived merely to corroborate my diagnosis. He said she had been to him pretty constantly for some time, that she was suffering from cancer, and would die, there being nothing to be done for her; she, however, lived for another two days. I then suggested that another physician should see her; accordingly he arrived, only to confirm in every respect the opinion of the first physician and my own views. I, however, had an idea, after watching the case carefully for three or four days longer, that this tumour might after all be only an accumulation of fæces. I accordingly proceeded to give large enemata of oil and warm water, with the result of removing the whole tumour into the chamber. I mention this case, as it was to me a most instructive one, and was the means, I believe, of saving many other general practitioners from falling into the same error, and on more than one occasion saving life.

Aneurism of the iliac arteries, by pressing upon the colon or sigmoid flexure, may be the cause of flattened stools and sharp lancinating pains like those witnessed in cancer; in other respects the diagnosis is not difficult.

Prognosis.—The prognosis of cancer of the intestine is of necessity bad. In these days of advancing knowledge in abdominal surgery, perhaps not so bad as formerly, as cases have been reported in which the cancerous mass has been excised, and the patient recovered from the operation and lived for some considerable time afterwards. The number of cases are not yet, however, sufficient, and the results are not such as to hold out any very great hope of our being able to extirpate the disease entirely without an undue risk to the patient's life.

Cases of cancer have been reported as becoming cicatrized, and a spontaneous cure, if I may use the expression, taking place ; such cases must be, however, extremely rare.

Treatment.—This form of cancer, like all others, is completely out of our reach so far as all treatment by means of drugs is concerned. The chief objects to be borne in mind are to regulate the bowels by means of enemata and mild cathartics ; the best of these are some of the aperient waters—Hunyadi, Friedrichshall, and the like ; the compound liquorice powder is also most useful. Diet should be strictly attended to ; all foods should be easily digested and quickly assimilated.

To relieve the pain, sedatives and narcotics, either by the mouth or subcutaneously, must be freely had recourse to.

When, as very often is the case, the intestines above the obstruction are distended with flatus, causing the patient intense suffering, the greatest possible relief may be obtained by the use of the aspirator, passing the fine needle into the distended bowel, or, if an aspirator is not at hand, a fine trocar and canula will answer the same purpose.

In many cases the surgeon is quite justified in performing abdominal section with a view of discovering the nature and extent of the growth, and, if practicable, removing it. So far back as 1843 M. Reybard excised a tumour in the sigmoid flexure, along with three inches of the intestine, and the patient recovered from the operation. The tumour grew again in the course of six months, but the patient survived the operation for a year.

To Mr. John Marshall we are indebted in this country for the first clear description of this operation of colectomy, in a clinical lecture delivered by him at University College Hospital.

The case he describes is that of a woman aged 49, who was admitted into University College Hospital on the 8th April, 1882. She had been treated for several attacks of intestinal obstruction, which was supposed to be due to malignant disease. It appears, in July 1881, nine months before admission, her bowels, though previously regular, were confined for a week, during which time she suffered from colic. Three weeks later the bowels again became confined, and a dose of castor oil was given; this was followed by much pain in the lower part of the abdomen, which was relieved by fomentation. After this she remained tolerably well, but weak, until the 7th October, when she suffered from vomiting, which passed off in two or three days.

Between the end of October 1881 and the end of January 1882, the patient had at least seven attacks of obstruction, which lasted from one to ten days. At this time she was well nourished and showed no signs of grave disease. These attacks were relieved by opium and enemata, with a mild purgative (Hunyadi Janos) given once or twice. During these attacks the symptoms were these: constipation, but it is not stated whether flatus passed or not; vomiting, which in all but one instance became stercoraceous; more or less swelling of the abdomen; much colic; and often violent movements of the coils of intestine, seen through the abdominal walls. At the end of an attack sometimes the bowels acted copiously, and sometimes large fœtid scybali passed, relief soon following in either case.

On the 24th December a tumour was felt in the left iliac fossa, but this was probably fæcal, as it was never detected afterwards. There are no notes from the end of January until the 16th February, but on this date she commenced vomiting "coffee-grounds," whilst on the following day the vomit was black; no tumours of the stomach could be felt. Of late the patient has emaciated considerably. On the 20th February, after three days' constipation, the vomiting recurred, and on the

2nd March "coffee-grounds" were again thrown up. After this no vomiting is recorded, and it is stated that the bowels acted with more regularity under the influence of tamar indien. On the 31st March œdema of both legs appeared, but subsided in a day or two.

Previous to this illness the patient seemed to have enjoyed good health. Her mother is alive and healthy. Her father died of phthisis, aged 50. There is no history of tumour in the family.

State on admission, 8th April: The patient is very thin, pale, and careworn. Two days earlier she had passed some scybali. The abdomen was moderately full and tense. There was nothing characteristic in the shape; it was neither "hard" nor "pointed," nor was it full in some regions and sunken in others. There was, however, slight rounded elevation of the abdominal wall on either side of the recti muscles, having a nearly transverse direction, and obviously due to distended coils of small intestines, but no peristalsis was observed. There was not the least tenderness, even on deep pressure, at any spot, and no tumour was detected on the most careful examination. Neither liver nor spleen was felt. With the patient lying flat on her back there was dulness and deficient resonance; note extended to the edge of the kidney in either loin. On examination per rectum the lower end of the bowel was found to be empty and greatly dilated; bulging into its anterior wall was a mass of small intestines, which occupied Douglas' pouch. Below the sacral promontory the bowel regained its normal size.

On a subsequent occasion a long tube was passed in, and apparently without doubling upon itself, for about a foot, and an enema of three pints was given, which produced deficient resonance on the left side reaching up to the ribs. A larger quantity could probably have been injected. The uterus was in its normal position, and just two inches long; menstruation had ceased about six months, and had been normally performed. A subsequent careful examination of the abdomen under chloroform added nothing to the above data.

She went on pretty much in the same manner for the next week while in hospital. On the 13th she was looking very ill, her face pale, and features sunk and drawn by pain. The abdomen was fuller and more tense than on admission, and was the seat of frequent paroxysms of pain, each lasting a few minutes, starting from the hypogastric region, radiating thence over the whole abdomen, and being accompanied by obvious peristalsis. No point of cessation of the peristalsis was noticed. These symptoms continued during the day, with occasional vomiting. At night a simple enema was given, and after a dose of opium the pain ceased and the patient slept quietly.

The seat of the obstruction and its nature being, after the most careful examination, still doubtful and undecided, Mr. Marshall resolved to explore the abdomen through an incision in the mid line, and if possible remove any growth that might be discovered.

On the 15th, ether being administered, and the hand being introduced into the abdomen through an incision extending from just below the umbilicus to just above the pubes, an ounce or two of clear fluid ran out. The cæcum presented in the wound, and was first examined. It was normal to both eye and touch, while some small intestines which also appeared seemed too red. A good deal of small bowel was now drawn out and protected from the spray as much as possible by cloths wrung out in warm carbolized water, while the sigmoid flexure was examined. It was found to be quite empty, and in following it upward a mass nearly the size of a hen's egg was found fixed to the descending colon between the lower end of the kidney and the iliac crest. As no impression could be made upon it by finger, the conclusion that it was a growth and not an accumulation of fæces was apparent. There being no free mesentery to this portion of the bowel, it was quite impossible to bring the latter out through the mesial wound, although an attempt was made to do so.

This wound was, therefore, with the intestines, covered by a guard, and the patient was turned on her right side, with a stout sand-bag placed across beneath her. An incision three inches long and parallel to the last rib, and an inch and a-half above the posterior half of the iliac crest, was rapidly carried down to the tumour, which lay beneath the spot. The peritoneum was opened, the colon pushed through the wound and tied temporarily with thick catgut ligatures, one above and one below the new growth; then this latter was cut out by scissors, together with an inch of intestine above and below it. In the former position the intestine was only moderately distended, but evidently much hypertrophied, while below the gut was empty, and even smaller and thinner than normal. The strong ligature was removed from around the upper piece; a quantity of semi-fluid offensive fæces escaped, the wound being carefully protected. In a few minutes this ceased. The parts were well sponged with a solution of chloride of zinc, and the opened end of the bowel fixed to the peritoneal edge of the lumbar wound by a row of deep silk sutures passing through the serous and muscular coats only of the gut, while a superficial circular set of fine catgut sutures were applied through its whole thickness, and through the skin.

The lower end of bowel was left just projecting from the lower and hinder part of the wound, with the strong catgut ligature drawn tight upon it.

While this was being done, the wound in the mid-line of the abdomen had been closed in the usual way with carbolized silk sutures, and had been dressed antiseptically.

The patient gradually sank; and on the 18th, three days after the operation, died.

Reybard, of Lyons, was, as I have said, the first to perform the operation of colectomy in 1833. His patient, a man only 28 years of age, had suffered from pains radiating through the lower limbs, from severe colic, and from occasional intestinal obstruction, with purulent discharge from the bowel. A tumour, the size of an orange, was felt deeply embedded in the left iliac fossa, and was somewhat movable; it could not be felt per rectum. Reybard concluded it was cancer of the sigmoid flexure, and determined to remove it, with the part of the intestine implicated. The operation was performed by an incision through the abdominal parietes, above and parallel to the crest of the ileum. The tumour was with some difficulty brought out of the abdomen; two ligatures were passed through the mesocolon, on either side of the disease. About three inches of the intestines, with the new growth, were excised with the knife, and the mesocolic attachments divided with scissors. Several arteries were tied, and then the two ends of the bowel were joined by a sort of "furrier's" suture. The intestine was replaced, and the abdominal wound sewn up. On the thirty-eighth day the wound was quite healed, and the action of the bowels had become natural per anum.

Six months after the tumour and all the symptoms returned; and death took place *ten* months after the operation.

Gussenbauer, of Liège, performed partial resection in a man, aged 42, in the year 1877, for a painful nodulated tumour in the left side of the abdomen, accompanied by symptoms of obstruction. The tumour was of a cancerous nature. He removed the mass, with about three inches of the intestine. The patient died fifteen hours after the operation.

Gussenbauer, also, in 1879, attempted to remove a portion of the colon which was the seat of cancer, but he was obliged to end the operation as a colotomy.

Baum, of Dantzic, in 1878, removed a wedge-shaped piece of the ascending colon near its passage into the transverse colon, including an enlarged gland; the length of the piece removed was three inches and a quarter. The open ends of the bowel, passed one over the other, were brought closely together by six carbolized silk sutures.

The patient died on the ninth day.

Martini, at Hamburg, in 1879, removed a long, oval, and somewhat uneven, movable tumour, implicating the large curve of the sigmoid flexure. Four inches of the intestine, and the growth, which was of a cancerous nature, were removed. It was found impossible to approximate the two edges of the gut, so Martini invaginated the lower end within itself, and having closed it with sutures, returned it into the pelvic cavity. The upper end was stitched to the wound like a colotomy, and the man made a good recovery, and in two months returned to business wearing a truss over the artificial anus.

Czerny, in 1880, in the case of a woman, aged 47, who had for more than six months suffered from abdominal symptoms, found a few uneven tumours, the size of a hen's egg, situated on the left side of the abdomen, midway between the ribs and crest of the ileum. He diagnosed a malignant tumour of either the omentum or descending colon, near the sigmoid flexure.

He opened the peritoneal cavity to the extent of four inches and a-half over the site of the tumour and parallel with the fibres of the external oblique muscle. The growth was found to be covered by the great omentum, and connected with both the transverse colon and sigmoid flexure. The choice lay between a single resection of a long piece of intestine from the transverse colon to the sigmoid flexure, or of a double resection. Czerny decided upon the latter plan. Four temporary india-rubber ligatures having been applied, one above and one below each of the diseased pieces of bowel, a portion, two inches and three quarters in length, was cut out from the sigmoid flexure, and the opened ends stitched together by thirty-three sutures, arranged in two rows. Then a piece four inches and a-half long was removed from the transverse colon, and the cut ends brought together, at first by twenty-six sutures, and then by a few more. The mesocolic and vascular attachments were divided, and the diseased mass removed, a dozen ligatures on vessels being here necessary. This patient lived for seven months and eleven days after the operation. At the post-mortem examination, extensive recurrent disease in the course of the descending colon and sigmoid flexure was found.

Mr. Bryant, in 1881, performed a left lumbar colectomy for stricture of the descending colon in a woman, aged 50. Finding on opening the colon that no fæces escaped, he decided upon at once removing the strictured portion of the gut with its mesocolic attachments. The cancerous mass removed was about one inch in length, and its central canal admitted a No. 8 catheter.

The patient recovered, and was living five months after the operation.

To these may now be added others, one by Mr. W. Whitehead, of excision of the cæcum for epithelioma, in a man aged 38 years, who survived the operation thirteen days; and another by Mr. Treves, which lived only twelve hours after the operation; one by Mr. Lammiman, of lumbar colectomy and artificial anus, in a woman, for scirrhus of the descending colon, who died forty-eight hours after the operation; and Mr. Pitts'* case of laparotomy, and formation of artificial anus in the left groin at the outer third of Poupart's ligament, for epithelial stricture of the sigmoid flexure at its junction with the rectum, the patient making a good recovery.

The cases above narrated may be divided into two classes, namely, those in which the two ends of the gut were stitched together, after excising the diseased portion, and returned into the abdominal cavity, and those in which an artificial anus was intentionally left, the lower portion of the gut being ligatured and returned into the abdomen.

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* *Vide* St. Thomas' Hospital Reports, vol. xi, p. 75.

	Reybard.	Czerny.	Gussenbauer.	Baum.	Martini.	Bryant.	Marshall.	Whitehead.	Treves.	Lamniman.	Pitts.
Cases in which intestinal anastomosis with enteraphy was practised	1	1	1	1	....	....	....	....	....	....	....
Cases where artificial anus was left	....	....	....	....	1	1	1	1	1	1	1

Here we have, then, eleven cases where colectomy has been performed for either cancer or stricture of the bowel. Of these, eight were operated upon by abdominal incision alone, in two by a lumbar incision, and in Mr. Marshall's case by a primary abdominal incision, followed by another in the lumbar region.

Of the eight cases that were operated upon by abdominal section alone, some in the middle line and others by incision directly over the tumour, in four life was considerably prolonged, while in the other four death took place within seven days, and may be attributed to the result of the operation.

Mr. Bryant's case of lumbar colectomy was alive five months after the operation; while Mr. Marshall's, in which the primary incision was made through the abdominal parietes and the operation finished by lumbar colectomy, died three days after being operated upon.

In Czerny's and Baum's cases, fæces escaped through the wound in the abdomen, the one on the eighth day, and the other on the third day. In Czerny's case the feculent discharge continued from the eighth to the twenty-sixth day, some flatus passing naturally on the tenth and thirteenth days. Copious evacuations were produced by enemata. The external wound, which for a time gaped, became filled by granulation, and healed slowly in four months.

That the escape of fæces into the abdominal cavity is not necessarily fatal, then, is clearly shown. Undoubtedly, adhesive inflammation is set up in the peritoneal cavity; an abscess is formed, the result of the escape, and in due course may be discharged through the wound.

The question as to the best method of operating upon the disease, that is, whether it is preferable to make an incision in the front of the abdomen or in the loin, can only be decided by the position of the disease. If a distinct tumour is felt in the abdomen, without doubt the surgeon should cut directly down upon it. Again, if a tumour is not to be discovered, and the position of the obstruction is doubtful, it would be far wiser to make an incision in the middle line, and search for the seat of disease, than to make a lumbar incision with the possibility of opening the gut below the seat of mischief.

When, however, a stricture can be detected in the ascending or descending colon, and the exact seat definitely marked out, then the lumbar incision may be made with better hopes of a good result; for, as Mr. Bryant has shown, several inches of the colon can be drawn through the wound thus made.

In any case, if an operation is to be done at all for malignant disease of the bowel, it must be done early, before the patient becomes too enfeebled by the disease, and secondary deposits have taken place.

It has been objected that colectomy for cancer of the bowel is unjustifiable, as in every case secondary disease takes place, either in the mesenteric glands, liver, or kidneys, very early. True; but if one sees the case early enough, and can distinguish a tumour, the disease may be removed before the secondary mischief takes place, the same as removing an epithelioma of the lip or tongue.

Apart from this, even if the disease has advanced thus far, undoubtedly, the removal of the growth, and re-establishing the canal for the passage of fæces, or by the formation of an artificial anus at the seat of the disease, must be the means of contributing to the comfort of the patient during the last few weeks or months of his life.

Colotomy.—Of colotomy I shall have to say more when discussing cancer of the rectum. I will only say here that when the disease is situated in the middle or lower part of the sigmoid flexure, colotomy should always be performed; and, further, I would here urge the surgeon to divide the gut and ligature the lower end, returning it into the abdominal cavity. This prevents any possibility of fæculent matter passing into the portion of the bowel below the artificial anus and irritating the ulcerated and diseased surface.

Operations.—Excision of cancerous disease of the small intestine, or enterectomy, is best performed by the median incision, extending for some three or four inches either above or below the umbilicus; the abdominal cavity being opened, the surgeon introduces his two first fingers into the cavity and searches for the diseased portion; having found it, he withdraws it through the wound, and then introduces a large flat sponge, wrung out of warm carbolized water, into the opening for the object of keeping the remainder of the small intestines from protruding, and also to prevent any blood or excreta escaping into the wound when the gut is divided. The portions of intestine above and below the disease must now be secured to prevent the escape of fæcal matter into the portion of bowel to be excised. For this purpose Czerny used india-rubber ligatures. Some surgeons trust to pressure exercised by the fingers of an assistant; this, however, is much to be deprecated, as the hands of the assistant may become tired, or the operator might wish for his assistance in some other way. Ligatures of all kinds are not to be commended, as they are very liable to injure the delicate walls of the intestine.

Mr. Treves and Mr. Bishop, of Manchester, have devised a form of clamp, which, while differing somewhat in make and shape, are designated for the same purpose of clamping the gut above and below the part to be excised, and I certainly think these clamps are much to be preferred to either the ligature or digital compression.

Treves' clamp is made in two parts, one for the upper and one for the lower end of the intestine. These two portions are quite separate and readily applied, and occupy very little space. The compression surfaces are covered with india-rubber, and are brought together by means of screws. When the gut has been reached, and the two divided ends require to be carefully approximated in order that the sutures may be introduced, the two portions of the clamp are fixed by means of connecting rods, so that a rigid framework is formed, the length of which can be regulated by a slight and easy adjustment of these little rods.

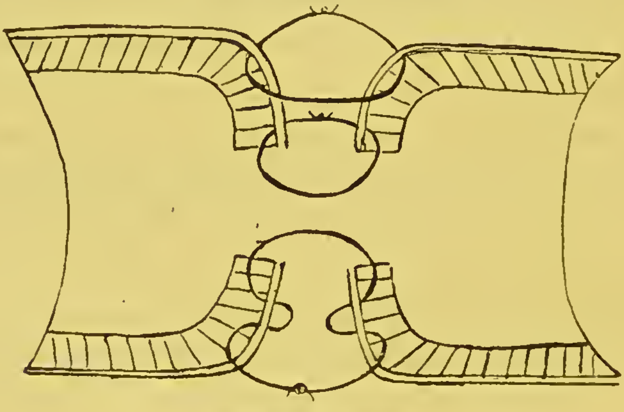
Mr. Bishop's clamp is of more elaborate mechanism, but as Treves' appears to me to meet every requirement, I need not describe it here.

The bowel having by means of the clamp been occluded at both ends, a flat sponge is placed underneath the parts before dividing them to prevent the possibility of any blood or fæces escaping into the wound.

The diseased portion of the intestine is now to be cut out with scissors, and the divided end washed with carbolized warm water. A V-shaped piece must next be taken out of the mesentery, to allow of the divided ends being accurately and neatly adjusted. In some cases where the disease is extensive it will be found necessary to extend this V-shaped incision quite to the root of the mesentery; before doing this, it will be well to take up and ligature the vessels in the mesentery that will have to be divided by the necessary incision. This can very easily be done, as they are quite apparent, and, indeed, are frequently engorged somewhat.

All bleeding points being secured, the divided ends of the intestine are brought together and secured by two rows of the finest Chinese silk twist; the first or innermost row, some fifteen or twenty in number, are arranged at the edge of the cut ends, passing through the serous and subserous coats, thus bringing the edges and mucous membrane in accurate apposition; the outer row of sutures, about forty or fifty in number, are arranged so as to bring the serous coats together at about a line from the margin of the cut ends of the intestine.

Two forms of sutures have been proposed and practised for uniting the divided ends of the intestine in these operations, the one by Czerny and Lembert, and the other by Gussenbauer, but the stitches are the same in principle, viz., to approximate the edges of the cut surfaces in the first place, and the peritoneal covering secondly. Gussenbauer, however, accomplishes this by means of one suture, whereas Czerny and Lembert use two, as shown in the above diagram. I cannot see any advantage to be gained by adopting the single suture; in fact, it appears to me to be very much more complicated in principle. I, therefore, should strongly recommend the use of the Czerny-Lembert system.



Czerny-Lembert's suture.

Gussenbauer's suture.

Various plans have been recommended for keeping the calibre of the intestine patent during the introduction of the stitches, as without such, the divided ends being limp and non-resistant, a difficulty has been felt in introducing the sutures. Of all these, I think the thin india-rubber bag suggested by Mr. Treves is the best, as it can be blown up to suit the size of any portion of the intestine which is divided, and it is so thin and pliable that it can be easily withdrawn between the two or three of the last stitches which may be left untied until the last for the purpose.

The divided ends of the intestine being thus securely stitched together, and the cut mesentery also united with fine silk sutures, the clamp is removed, and the loop of intestine returned into the abdomen.

The cases most adapted for excision are annular papillomata, or cylindrical-celled epithelioma of the great intestine, before they have formed adhesions.

The second method of performing resection of the diseased portion, by forming an artificial anus, is practically the same as just described for enterectomy, with the exception that after removing the diseased mass the ends of the intestine are carefully stitched to the edges of the wound, great care being taken to prevent the escape of any blood or fæcal matter into the abdominal cavity.

This operation has been attended with much less mortality than that of stitching the ends of the divided intestine together and returning it into the abdominal cavity. It has also this advantage, that at a future date, according to the circumstances of the case, the artificial anus may be closed by a further plastic operation, the intestine united by sutures, and the continuity of the bowel restored.

Another very strong argument in favour of forming a temporary artificial anus is to be found in the fact that, in nearly all cases which come to our notice demanding operative interference, the patients are suffering from obstruction, often in an acute form ; and the immediate object in operating is to give speedy and entire relief to the distended bowel, and in this way prolong the patient's life. This can only be done effectually by forming an artificial anus, as by the uniting of the ends of the intestine and returning them into the cavity, such relief is not given, as the peristaltic action of the bowel must undoubtedly be interrupted at the seat of the operation, and thus the passage of the contents of the bowel is rendered for a time impossible.

The length of time taken over the operation of uniting the intestine, is necessarily very protracted, and patients are usually in a state of great prostration before the operation is commenced; it, therefore, is desirable not to prolong it longer than is absolutely necessary.

Statistics.—The number of operations performed of resection of the intestine for malignant disease is not large, although it has been practised very frequently for other forms of intestinal obstruction, *i.e.*, the relief of artificial anus, gangrene after hernia, and occlusion of the bowels.

In 1882, Madelung collected 88 cases in which the intestine had been united with sutures after complete division, with or without removal of a diseased portion, with the following result:—

7 accidental wound—	
Recovered	3
Result not recorded...	1
Died	3
44 cases for gangrene of the gut in strangulated hernia—	
Recovered	21
Died	23
22 for cure of artificial anus—	
Recovered	14
Died	8
3 cases of internal strangulation—	
Died	3
9 cases of tumours of the gut—	
Recovered	6
Died	3

Reichel has collected 121 reported cases of resection of the intestine, with subsequent suturing of the ends.* Out of this number, 58 died, 58 are described as cured, and 5 recovered with permanent fæcal fistula.

37 cases for relief of artificial anus—	
Recovered	21
Recovered with permanent fistula	2
Died	14
56, cases for gangrene after hernia—	
Recovered	24
Recovered with permanent fistula	3
Died	29
8 cases for occlusion of the bowel—	
Recovered	2
Died	6
10 cases for cancer of the bowel—	
Recovered	5
Died	5
10 cases for injury to the bowel—	
Recovered	6
Died	4
The causes of death were as follows :—	
Collapse	6
Marasmus after fæcal fistula	1
Diseases not connected with original malady	3
Vomited matter entered trachea during operation	1
Intestinal obstruction following the suture	3
Peritonitis	34
Causes not known	9

The chief cause of death, as will be seen, is peritonitis, caused no doubt by the escape of fæcal matter into the peritoneal cavity.

In the operations performed for malignant disease, five are reported to have had a favourable termination out of ten cases operated upon ; and this, I think, we must acknowledge is very encouraging, as in all these cases, from the nature of the disease, death must have speedily taken place had no operative procedures been had recourse to.

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* Treves : "Intestinal Obstruction," p. 488.

CHAPTER IX.

CANCER OF RECTUM AND ANUS.

THE importance of cancer of the rectum cannot be overrated, the number of deaths occurring from this disease being very great; in fact, it holds a position in the lists of mortality from cancer next to that of the tongue.

In the Cancer Hospital, out of a total of 1,908 cases of cancer admitted, 58 were suffering from cancer of the rectum, or slightly more than 3 per cent.; this agrees with result of report of the cases occurring at the K. K. Allgemeine Krankenhaus, and referred to in the account of cancer of the intestine. Mr. W. R. Williams, in a Table of statistics of cases he has collected as occurring in Middlesex, St. Bartholomew's, St. Thomas', and University College Hospitals,* has found the rectum to be the seat of carcinomatous diseases in 257 cases out of a total of 5,556 cases of cancer generally, being at the rate of 4·4 per cent.

Cancerous disease of the rectum and anus may either exist as a primary affection, or as a secondary growth, encroaching from the uterus or vagina in the female, and sometimes, although I believe very rarely, from the prostate in the male.

The disease usually commences in one of the following situations, viz.: (1) the anus, extending upwards into the gut; (2) a point about a finger's length from the anus; and, lastly, at the junction of the rectum with the sigmoid flexure.

When the disease commences at the anus, it is almost invariably of the squamous epitheliomatous type, and presents all the characters of that disease.

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* "Lancet," vol. i, 1884, p. 934.

Mr. Harrison Cripps, as a result of his investigation into new growths of the rectum, doubts the existence of scirrhus and medullary cancer in that part, and has been unable to find any examples of such growths in that segment of the bowels. Mr. Treves, who has also examined into this question, says he has not been able to find any clear description of an undoubtedly primary scirrhus growth, or any record of cases of primary cancer of the bowel, that upon microscopical examination was proved to have been without doubt an encephaloid growth.

M. Haussmann, in a monograph on cancer of the intestine, and which Mr. Treves refers to in his work on intestinal obstruction, after discussing this point very thoroughly, summarizes the discussion by saying: "We will give, then, cancer of the intestine the following definition: 'Cancer of the intestine is cylindrical epithelioma of this organ.'"

Acting, then, upon the investigation of these well-known and careful observers, we must accept the conclusions they have arrived at as conclusive evidence that cylindrical epithelioma is by far the most common form of cancer met with in the intestines or rectum, and that scirrhus, medullary, and colloid cancer are very rarely to be found in these situations.

The disease, no matter at what part existing, always originates as an adenoid deposit in the submucous tissue. It commences, as in the intestines, in the epithelial lining of the crypts or tubules which occupy the mucous membrane of the larger part of the tract of the rectum, in the same manner as is found in the colon. These tubules gradually disappear towards the anus, which no doubt accounts for this part being much less commonly affected with primary disease than the anus or upper parts of the rectum.

If the growth of the disease is slow, the mucous membrane covering the disease in its early stage is intact, the disease itself resembling a foreign body beneath it. It commonly spreads as a thin layer between the mucous and muscular coats of the gut; and not uncommonly will the disease thus spread under several square inches of mucous membrane, while its thickness scarcely exceeds one-fifth of an inch. At other times, but more rarely, the disease increases more rapidly in thickness, pushing the mucous membrane inwards, producing a distinct tumour in the cavity of the bowel.

Sooner or later, active ulceration sets in. At first, the mucous membrane over the centre of the mass is destroyed, exposing the subjacent growth, and if this exists as a thin layer, it also is destroyed by a continuation of the ulcerative process. It not uncommonly happens that deep ulceration is produced, the base of which, towards its centre, is composed of the remains of the hypertrophied muscular coat blended into a tense, cicatricial tissue with the fibrous elements of the part. Towards the margin of the ulcer the growth is again apparent, forming a prominent overlapping edge. From points in this margin fungating masses will in time project into the rectum.

Papillomata are also commonly met with in the rectum. These are new formations, resembling ordinary papillæ, and here commence between the mucous and muscular coats or subepithelial connective tissue. They grow slowly, and form a projecting tumour, which, clinically, is not of much importance. They rarely attain any very large size. If, from any cause, they become irritated, they have a tendency to ulcerate, and often abundant hæmorrhage takes place. This is not to be wondered at, as all these new growths have a great tendency to become papillary, the result of physical condition, and are soft and vascular. These tumours, when they arrive at this stage, are very liable to be confounded with cylindrical epithelioma. They very probably are opposite types of the same disease.

Mr. Harrison Cripps, in a paper read by him before the Pathological Society in 1881, says: "In the rapidly-growing tumours the same spaces and epithelium are present as are found on section through well-marked slowly-growing tumours, which show spaces lined with cylindrical epithelium lying in retiform tissue, but in a less defined form, both the cells and fibrous tissue being embryonic. The mode of development of these spaces is ascertained by observing the growing margin, which exhibits epithelial buds and processes arranged in dendritic fashion. These leaflet processes bend over and coalesce, forming the spaces lined with epithelium, which at an earlier stage was on the surface. Secondary outbuds of epithelium grow in these spaces by the proliferation of the cells. He had not been able to trace a direct continuity of growth between the Lieberkühian follicles and surface of epithelium, and the deeper-seated new formations, a greater or less amount of retiform and fibrous tissue intervening. But in this intermediate tissue there is, especially near the new epithelial growth, a large amount of leucocytes, and their presence has suggested the view taken of the origin of the deep-seated epithelial new formation." This view of Mr. Cripps' is open to just criticism; I cannot but think, however, that, from his deep investigation into this subject, his conclusion must be treated with the greatest possible respect. That lymphoid cells may be converted into epithelium I suppose there can be no doubt, for, in growths in the liver secondary to epithelioma of the rectum, as Dr. Moxon has pointed out, all the structures of Lieberkühian follicles are reproduced, and is only explicable on this hypothesis.

Carcinoma either becomes infiltrated in the walls of the rectum, or sometimes is present as a distinct tumour. In the former case, a part only of the circumference may be affected; but if, as too often happens, the patient is not seen until late, the disease probably will have invaded the whole of the circumference of the gut. When existing as a simple tumour, it occupies a particular spot, usually situated on the posterior aspect of the rectum. The disease. progresses in the same manner as in the stomach and colon. When once ulceration has commenced, the disease progresses very rapidly; this is, undoubtedly, increased by the constant passage of irritating matter over the affected part; fungating masses spring from the surface which bleed readily. These may sometimes be soft and papillomatous, or hard and firm. The growth can be usually felt to terminate abruptly, both above and below; and, if the finger be introduced through the disease, the bowel above will be found to be dilated, sometimes uniformly, at others sacculated; the muscular coats will be felt to be thickened. Occasionally simple ulceration of the mucous membrane exists.

The subjacent tissues early become invaded, and the walls of the rectum become fixed to the parts around. In the female, the vagina, and in the male, the cellular tissues all around the bowel, become infiltrated by the disease. Cancer seems to have a greater tendency to spread upwards than downwards. Very often the anus, and perhaps some two inches of the bowel, are perfectly healthy, and above this a mass of disease is felt through which it is impossible to pass the finger. The growth has been known to extend upwards to the transverse colon, transforming all the descending colon into a cancerous mass, while the inferior three inches of the rectum had not suffered the slightest change.

Sarcomata are occasionally present. Thus, Dr. Ball, at the Academy of Medicine in Ireland, read a paper on a case of melanitic sarcoma of the rectum removed by operation. The patient, a fairly healthy-looking woman, aged 60 years, stated that eleven months before coming under observation she had noticed a pile, which had been removed by operation, after which she remained free from rectal symptoms for four months. She then suffered from increased difficulty in evacuating the bowels. A slight discharge of bloody mucus appeared, and she became conscious of a hard tumour in the rectum, which partly protruded on stool. These symptoms continued to increase, and on admission, defæcation was difficult and painful, the pain being referred to a point immediately above the symphysis pubes. Upon examination, the anus appeared normal, and the sphincter was not unduly relaxed. About an inch from the anal verge, on the anterior aspect of the rectum, two distinct and tolerably hard tumours could be felt, evidently implicating the mucous membrane; and, by pressing the finger well up, the superior limits of both could readily be made out; and below them a smaller mass was to be felt. The rest of the rectum appeared healthy, and no abnormal adhesion of the bowel to the other pelvis viscera was indicated.

The mass was extirpated by the usual method, a free posterior incision being made to give room. The patient did well. The piece removed measured about three inches in breadth and two and a-half inches in length, and consisted of the anterior two-thirds of the circumference of the bowel. There were two principal growths, separated by about half-an-inch of mucous membrane, and equidistant from the anus. The larger had a depression in the centre, and was of a whitish colour; the other was black on the surface, and spherical in shape. Below the principal tumour a smaller nodule, also black in colour, was to be seen. A section carried through the two larger growths showed the lighter-coloured one was of the same hue throughout, except where a small blood-clot existed in its interior; but the second was of a sooty black colour as seen in section. The shape and arrangement of cells were alike in both tumours, being those of typical sarcoma. The cells were round, ovoid, or even spindle-shaped, with large nuclei, and in some portions resembling a form of alveolar sarcoma. In the larger one there was a very slight amount of pigment, but in the smaller pigmentation was extreme, some of the cells appearing as large masses of blackish material, while others had dark granular material more sparsely scattered in their substance. In the portion of mucous membrane between the two growths the glands were much atrophied, and surrounded with lymphoid tissue.*

Age.—Cancer has been observed in the rectum in very young persons. The late Mr. Campbell de Morgan drew attention to this, and reported cases. Mr. G. Lawson has also met with it in several instances in young persons under 20 years of age. Dr. G. Schœning has reported two cases in girls aged 17, in both of which he excised the rectum; one died two months after the operation, and the other four months after the disease was excised. The average age appears to be about 43 years, the large majority being met with between the ages of 45 and 55.

Etiology.—The cause of cancer of the rectum must be ascribed to a great extent to local irritation; from its situation it is not surprising that it should be a favourite seat of the disease. In one case that came under my notice a short time since, on examination a quantity of fish-bones were found mixed with the fæces in the rectum, causing very great irritation. The cicatrices, the result of ulceration, are often the site of malignant disease, as also are fistulæ and some forms of piles.

Symptoms.—These vary in different cases, according to the form in which the disease exists, and its situation. Among the earlier symptoms of cancer of the rectum are usually constipation, alternating with diarrhœa, accompanied by a general uneasiness in the sacral and lumbar regions of a dull, heavy, aching character, which is often conveyed to the nates, thighs, and hips. The patient has a more frequent desire than usual to go to stool, and a sense after he has done so that the bowels are not sufficiently relieved; flatulence, acid eructation, and looseness of the bowels at night or early morning may be complained of. Even at this early stage the fæces may occasionally be streaked with blood. Pain is often very deceptive; if the disease is situated high up in the rectum, probably pain will not be complained of at all, but if situated in the lower third the pain is often most acute. When situated in the upper two thirds, the pain complained of is of a more wearisome character, dull, heavy, and gnawing, with probable irritation of the bladder, and conveyed down the leg. Pain, when acute, is usually caused by ulceration and irritation of acrid matter, and nearly always the disease is situated in the lower third. The discharge in the first instance is thin and sanious, and not considerable; irritation and itching about the anus is a common source of annoyance. As the disease progresses this discharge becomes more and more profuse, and at this stage hæmorrhage is often very abundant, the discharge is very offensive and slimy, and the patient rapidly becoming emaciated and miserable. Each act of defæcation causes bleeding, and often great suffering and tenesmus.

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* "Lancet," vol. i, 1885, p. 65.

A short time ago a gentleman consulted me suffering from constipation and pain in defæcation. He said he often went to the closet three or four times before he could thoroughly relieve himself. The calibre of the fæces had been gradually getting smaller, and he occasionally passed a little blood. He had sought advice and had been treated for piles, but had never been examined by the rectum. On examination the anus was perfectly healthy, and the bowel as far as my finger went seemed quite free from disease; at the extreme end I felt, however, a hardish, smooth, oval mass, resembling very much the os uterus. Through this I endeavoured to pass a small rectal bougie, but found the opening so small that I could not do so. This patient had been losing flesh steadily for some length of time, and after his motions he suffered greatly from tenesmus.

Obstinate constipation and symptoms of obstruction in the bowels are sometimes the first symptoms which induce the patient to seek advice. The cause of this sudden obstruction is sometimes the result of simply blocking of the canal by the growth. Another cause is, as shown in many of our pathological museums, from the pressure of the accumulated fæces above the disease, causing its invagination into the bowel immediately below. Another reason is, the bowel above the disease becomes sacculated, and filled with hardened fæces, which stretches the bowel outside and beyond the disease, pressing upon the bowel on the distal side of the growth. In this condition cases have been reported in which a fistulous opening has been formed and a new canal established.

As the disease progresses defæcation becomes more and more difficult, a discharge of pus or muco-pus frequently accompanies that of the fæces, which are more or less tinged with blood ; occasionally, but very rarely, hæmorrhage is somewhat profuse. The constipation, which until now has been the most common symptom, is often alternated with profuse diarrhœa, the former lasting often for days, while the accumulation of flatus and fæces swells the abdomen to an enormous extent; this is followed by diarrhœa, caused either by purgatives or by the natural irritation of the acrid secretion, leaving the patient in a most prostrate condition, from which it is often most difficult to rally. Before, however, this state of things takes place, all the symptoms of strangulation of the gut may have occurred, nausea, stercoraceous vomiting, hiccough, coldness of the extremities, vertigo, and even delirium ; the urine is often passed involuntarily under the patient ; sometimes, however, the patient being unable to pass urine, retention, accompanied by distension of the bladder, adds to his miserable condition.

Abscesses often at this stage form in the cellular tissue around the rectum in the male, opening into the bladder, urethra, or the ischio-rectal fossa, and in the female they may open into the vagina, causing great relief by affording facility for the passage of fæces. In the male an opening is often formed into the bladder or urethra, flatus and fæculent matter passing *per urethram.* Œdema of the genitals and lower extremities now sets in, due to the pressure on the venous system obstructing the return of blood from those parts. If the symptoms described are not relieved by the formation of an artificial anus either in the loin or groin, the symptoms continue to increase; extreme tympanitis, accompanied with stercoraceous vomiting, followed by coma and death; or, the intestine giving way, its contents are effused into the peritoneal cavity, and death relieves the victim from further suffering.

These symptoms, as mentioned above, are open to variation according to the nature and extent of the disease. Thus, in a case of growth into the rectum caused by cancerous deposit, which may be limited to a small portion of the bowels, and circumscribed in extent, it is reported that defæcation may be accomplished with comparative ease until the end. In my own experience I have not seen a case of this description without marked difficulty of defæcation, increasing as the disease extends; and I am inclined to think that cases in which there is no such difficulty are not malignant, but probably papillomatous.

In cases of annular stricture, in which the whole calibre of the gut is involved, the form of the fæces discharged gives sufficient evidence of its presence. Instead of being cylindrical, the fæces become flattened and tape-like, the patient has the greatest difficulty in relieving himself, and, as in the case above referred to, has to repeat the operation three or four times before he feels he is relieved. Each act of defæcation is accompanied with considerable tenesmus and exhaustion. As the disease progresses the difficulty increases, and the calibre of the fæces becomes less and less, until complete obstruction ensues, when all the symptoms of strangulation of the bowel follow; and unless relief is speedily given, death quickly succeeds.

Should the growth be situated low enough down, it can be easily discovered by a digital examination; should it, however, be in a portion of the bowel beyond the reach of the finger, the passage of a bougie, or the giving of an enema, may enable the surgeon to determine where the obstruction exists, although it will not enable him to come to a conclusion as to the true nature of the disease. The introduction of a wax-bougie will often enable him not only to ascertain the distance at which the stricture is situated from the anus, but will also, by moulding itself into the strictured part, give him an idea of the extent of the stricture.

The speculum ani may be of service in some cases, but I am of opinion that the surgeon can determine very much better the nature and extent of the disease by manipulation than he can by the speculum, and at very much less pain to the patient.

The symptoms of cancer of the anus are much the same as those described as being present in malignant disease of the rectum; but the disease being more or less situated on the exterior of the anus, attention is earlier attracted to it, although here it is astonishing how long patients will get about with the disease, fancying they are merely suffering from piles. The form of disease here is almost invariably squamous-celled epithelioma. Complete stricture is, however, not common; indeed, as the ulcerative process progresses the anal orifice may be actually widened. The disease often advances with very great rapidity in this situation, and death is sometimes hastened by inflammation and diffuse suppuration within the pelvis.

The lymphatic glands on the sacral region are early implicated, and the cellular tissues between them and the bowel become infiltrated with the disease, binding the parts intimately together. In such cases the removal of the disease is well nigh impossible, and should not be attempted.

Diagnosis.—A careful and thorough examination is of course called for, whenever we suspect cancer of the rectum; to do this a digital examination should be invariably made. If the patient is very sensitive, it will be best to administer an anæsthetic. The best position for the patient to be placed in is either upon the left side, with the legs well drawn up, and the nates projecting over the edge of the bed, or lying face downwards, over a mound of pillows, with the buttocks raised. If the surgeon is unable to ascertain the presence of disease by means of his finger, the anus should be well dilated and a large speculum introduced, and a strong light reflected into the part; by this means the whole of the lower part of the bowel can be thoroughly examined. It is very rarely by adopting these means that the surgeon fails to obtain all the information he requires, in fact, it is on very rare occasions that the speculum is needed at all; but a great aid to digital examination is afforded by the anus being kept well open by retractors.

Cancer has to be distinguished from many other diseases of the rectum, but usually there is but little difficulty in arriving at a correct diagnosis.

Simple stricture perhaps simulates cancer in many of its symptoms more than any other disease of the rectum. The disease, however, is usually situated higher up in the canal than cancerous disease. There is not commonly any pain caused by this affection, excepting during defæction. If, as should always be the case, when a patient presents himself to the notice of a surgeon, with symptoms of rectal disease or irritation, a digital examination be insisted on, he can usually, without difficulty, decide at once if the stricture is caused by malignant disease or by a simple stricture of the bowel. Treatment in simple stricture is usually very successful, whereas in cancer it is highly unsatisfactory; in this disease, however, the patient probably suffers from constipation, the fæces are smaller in calibre than normal, or ribbon-like; the patient probably suffers from anorexia and loss of flesh.

Syphilitic, or simple chronic, ulceration of the rectum, as of the mucous membrane generally, when in course of cicatrization, is accompanied with thickening and consequent contraction of the tissues involved, which gives rise to many of the symptoms ascribed to cancer. The general symptoms may resemble very closely those of the more serious disease; this, however, is not a common occurrence, and by a careful examination, either digitally or with the speculum, and an inquiry into the previous history and symptoms of the case, the surgeon is usually able without very much difficulty to arrive at a correct diagnosis.

Spasmodic stricture and *hysterical affection* of the rectum need only be mentioned, as by digital examination, under an anæsthetic, the true nature of the disease will readily be ascertained.

Paralysis of the gut is recognized by the accumulation of large masses of fæces of natural appearance and character that are sometimes discharged after accumulation in the distended bowel, and by the absence of constriction as discovered by the finger or bougie.

Enlargement of the prostate in the male, or the uterus in the female, or displacement in the latter organ, tumours in the mesentery or ovary, urinary calculi, large abscesses alongside the canal, or displaced pessaries, may all give rise to many of the symptoms of stricture of the rectum, by pressure, causing complete or partial obstruction; these can all be ascertained by careful digital examination of the parts.

Rectal polypi, when single, are not likely to be mistaken for cancer, the absence of pain and the pedunculated growth being quite sufficient to distinguish them. There is, however, one form of polypus which occurs in the rectum, and to which Mr. Cripps, in his essay on cancer of the rectum, alludes, which is extremely difficult to distinguish, and a specimen may be seen at Middlesex Hospital (Museum, Series 8, No. 106). It is described as a disseminating polypoid growth of the rectum.

Villous tumour of the rectum is a very rare disease, Mr. Gowland having only met with nine cases in his extensive practice, while Mr. Cripps has only met with two. There are, however, several specimens in the Museum of the College of Surgeons and the hospital museums. In University College Hospital are three specimens, Nos. 1071, 1072, and 1073, the description of which I cannot do better than relate as they appear in the Museum Catalogue.

" *The villous tumour of the rectum.* This is composed of long branching papillæ, often half-an-inch or more in length, seated on a flat, slightly raised base. The papillæ are composed of delicate vascular areolar tissue, covered with columnar epithelium. These tumours may reach a considerable size. They occur in adults, and are seated usually within reach of the finger, and are confined to one side of the gut.

"1071. A large villous tumour, somewhat like the flowering head of a chrysanthemum, which grew from the mucous membrane of a rectum. The growth is of a compressed globular form, and has a diameter of about two and a-half inches; it presents a slight indication in the furrows in its margin of being composed of numerous small closely applied lobes; the main part of the growth consists of long leaf-like curling processes arranged upon a convex solid base. At the back of the preparation is a small flat surface, deeply buried among the long processes surrounding it—the severed pedicle by which it was attached to the mucous membrane. The tumour is probably composed of simple papillæ invested with columnar epithelium. Above the main tumour is suspended a much smaller mass, which, to judge from the size of its processes, is probably a portion detached from the tumour first described.

"The parts shown were removed by Mr. Quain from the rectum of a lady, æt. 67. When removed the tumour was upwards of four inches in length, of a bright red colour, and covered with blood and mucous. It was fixed to the rectum, about three inches above the anus, by a fibrous pedicle two inches broad.

" 1072. A growth similar to the preceding, but much less considerable in size. Its natural form appears to have been a flattened sphere. It presents appearances of lobulation, and is composed mainly of long, tufted, close-packed projections arranged upon a convex base. It appears to have been attached by a very slender neck to the mucous membrane, the only indication of a pedicle being on the front of the specimen, where there is a small flattened space, with a clearly divided surface, a little to the left of its middle. The tumour is of a reddish-brown colour, and was very vascular.

"It was removed by Mr. Quain from the rectum of a middle-aged lady who had lost blood per anum, at intervals, for twenty years. The tumour was protruded at each act of defæcation; it was connected with the posterior wall of the rectum above the sphincter. It was probably sessile; but when protruded a narrow fold of mucous membrane descended with it, after the manner of a peduncle. The patient made a good recovery.

"1073. A vascular tufted growth removed from the rectum of a lady 55 years of age, from the mucous membrane of which it grew by a narrow pedicle. The growth is of somewhat ovoid form, deeply foliated, and shows signs of lobulation. Its surface is somewhat softened, and has commenced to disintegrate, as though the growth had been removed by ligature, or it may have commenced to ulcerate.

"The patient rapidly recovered after the operation."

In many cases that come before our notice, patients consult one, saying they are suffering from piles and asking for relief. Not unfrequently, however, in cases of cancer of the rectum, there exist some very firm and painful piles, the result of straining, and the interference with the venous return caused mechanically by the cancer, and it is not uncommon to suppose that the whole ailment is due to an attack of piles, and the presence of cancer is completely overlooked. At others, constant irritating diarrhœa is the only trouble complained of. In either of these cases, or in fact in any cases where patients complain of rectal irritation or discomfort, I cannot too strongly urge upon you the universal practice of *digital examination* of the rectum being insisted upon.

Before discussing the subject of treatment, I think it well to give a short anatomical description of the rectum as described by Ellis.

The rectum, or the lower part of the great intestine, extends from the articulation between the sacrum and the left hip-bone to the anus, and is kept in place by the peritoneum and the recto-vesical fascia. The intestine is about eight inches long, and has a winding course, for it follows the curve of the sacrum and coccyx; it is divided into three parts—upper, middle, and lower.

The *upper part*, longer than the others, extends obliquely from the sacro-iliac articulation to the centre of the third piece of the sacrum. Surrounded almost entirely by the peritoneum, it lies against the sacrum, the pyriformis muscle, and the sacral plexus of the left side. In contact with it, are the branches of the left internal iliac artery, and the left ureter. In some bodies this part of the intestine is much curved to the right side.

The *middle piece* lies beneath the bladder, and reaches to the tip of the coccyx; it is about three inches in length, and is covered above by peritoneum on the front and sides, but only in front at the lower part. Resting on it is the triangular part of the bladder, with the back of the prostate and the vesiculæ seminales and vasa deferentia; and behind it are the sacrum and coccyx. On each side is the coccygeus muscle.

The *lower part* is about an inch and a-half in length, and is curved from the tip of the coccyx to the anus; at first it is dilated, but at the anus it is contracted. This end of the intestine is without peritoneal covering, and is supported by the lower part of the triangular ligament of the urethra, and by the levatores ani muscles.

Above the extremity of the rectum (in this position of the body) are the fore part of the prostate, the membranous part of the urethra, and the bulb of the corpus spongiosum urethræ; but as the gut recedes gradually from the urethra there is an angular interval left between the two. The levatores ani muscles descend on its sides, and unite beneath it, supporting it in a sling; and the sphincter muscles surround the aperture. Sometimes the end of the intestine within the anus is very much enlarged, especially in women and old men; and in that condition in the male it rises up on each side of the prostate.

The rectum is not so curved in the female as in the male, and is generally larger. Descending along the middle of the sacrum and coccyx to the anus, the intestine is divided into three parts :—

The *first part* ends over the third piece of the sacrum, and is enveloped by the peritoneum, except posteriorly; its connections are similar to those of the rectum in the male.

The *middle part* reaches to the tip of the coccyx, and has the vagina above and in contact with it. The peritoneum extends on the front for a short distance.

The *lower part* curves to the anus, away from the vagina so as to leave between the two a space which corresponds, on the surface of the body, with the part of the perinæum between the anus and the vulva. The levatores ani are on the sides, and unite below it, and the sphincter muscles surround the extremity.

Treatment.—Here, as in cancer in other parts of the body, we are constantly asked, " Is there no drug that will relieve, if not cure, the disease ?"

To cure ? Alas ! no. There is no drug yet discovered that appears to have the slightest effect upon the disease. To relieve ? Yes, much can be done to alleviate suffering, and possibly prolong life. Sedatives, belladonna, morphia, and conium will all help to allay suffering. Opium, however, should be administered as seldom as possible, as it is often followed by thirst, sickness, and constipation. The bowels should be kept always slightly relaxed by means of the compound liquorice powder, a teaspoonful every night or morning in a wine-glass of warm water; the confection of senna ; or some of the aperient mineral waters ; but purgatives should be avoided as much as possible. Scrupulous cleanliness should be insisted upon, the parts being bathed with a solution of Condy's fluid or Sanitas with a soft piece of wool, so as to prevent collection of the discharge about the anus, which gives rise to so much irritation.

Should there appear to be a collection of fæces above the disease, a warm water, linseed-tea, and Condy's fluid enema should be given. A large gum-elastic catheter, well softened in warm water, will answer well for this purpose. In cases where the pain is very great in females, a morphia or opium suppository passed into the vagina will be most grateful; in men the injection of a small quantity of either liq. opii in solution of starch will give comfort. Beyond this it is out of the power of the surgeon to relieve. Pledgets of cotton wool dusted with iodoform and placed between the buttocks to absorb the discharge, and the parts freely anointed with boracic acid ointment, will add considerably to the patient's comfort.

In estimating the advantages of surgical treatment, the probable comfort of the patient, and the period of his survival in case of non-interference, must be taken into account in the first place, and secondly, if the surgeon determine to attempt an operation, what are the prospects of prolonging the patient's life, and giving him relief from suffering during the remainder of his life.

The forms of operative procedure that should be attempted are either wholly palliative or attempts at a radical cure.

The palliative operations are: 1. Colotomy either in left or right line. 2. Littré's operation of opening the sigmoid flexure on the left or right iliac region. The operations for attempting the radical cure are necessarily by excision of the diseased part.

To effect the latter, Professor Esmarch, in a paper on this subject read at the Medical Congress held at Copenhagen in 1884, laid down the following propositions: 1. In the treatment of cancer of the rectum, the same principles hold good as in the treatment of cancer of other parts of the body. 2. Extirpation should be as early and as complete as possible. 3. The more the surrounding healthy parts are removed with the diseased, the greater reason is there for hoping that recurrence will not take place at all, or will be long delayed

4. Experience teaches that early and thorough extirpation may be followed by permanent recovery (Dieffenbach, Schuh, Billroth, Rose, Nussbaum, Kocher, Czerny, Bardenheuer, Holmer, &c.). 5. As, in cancer of the rectum, the lymphatic glands are secondarily affected at a comparatively late period, operation may be followed by permanent success when the disease has lasted some time and has become extensive. (Czerny observed recoveries which lasted above four years, although the cancer had been present three or four years.) 6. The prognosis in regard to return of the disease is good in proportion to the slow development of the new growth, the delay in the appearance of distressing symptoms, and the completeness of the operation. 7. The simple cylinder-celled cancers (destructive adenoma and adenoma-carcinoma), which proceed from the more superficial layers of the mucous membrane, generally give a better prognosis than the forms with small alveoli and the gelatinous forms, which more rapidly enter the deep submucous layers. The greater the disposition to gelatinous degeneration of the cancer, the more malignant, usually, is its course. 8. Extirpation of a cancerous nodule from the wall of the rectum is sufficient only when the nodule is well circumscribed and movable, and when only a part of the wall of the rectum or of the anus is implicated. 9. In all other cases, amputation of the rectum beyond the points of the growth is indicated. 10. The entire rectum, as far as the sigmoid flexure, may be removed with good result. 11. The principal dangers of the operation are (*a*) hæmorrhage; (*b*) acute, purulent, and ichorous inflammation of the connective tissue (septic lymphangitis, retroperitonitis, and peritonitis). 12. These dangers are to be combated: (*a*) by very careful hæmostasis during the operation; (*b*) by very careful primary disinfection, and provision for the free escape of the secretion of the wound (by drainage and the avoidance of cavities). 13. In amputation of the rectum high up, opening of the peritoneal cavity is unavoid-

able; but peritonitis does not generally follow, if the opening be at once closed by suture under strict antiseptic precautions. Drainage of the peritoneal cavity is indicated only in exceptional cases (for instance, where considerable soiling of the peritoneum, during the operation, cannot be avoided). 14. The progress of operative skill has essentially diminished the dangers of the operation, the death-rate having fallen from 50 to 20 per cent., and even lower; and it is to be expected, with confidence, that this proportion will become even more favourable, as in ovariotomy, hysterectomy, &c. 15. The functional disturbance following amputation of the rectum is slight in comparison with the distress caused by the cancer. Incontinence of fæces is not complete, especially when the external sphincter has not been removed. Systematic cleanliness and the use of a suitable apparatus for closure commonly relieve the difficulty. 16. Resection of a portion of the intestinal tube in its whole circumference, followed by suture of the two ends of the intestine, is not to be recommended, since the lower portion of intestine generally sloughs. It is better to remove the mucous membrane of the lower end, preserving the external sphincter muscle, and to fasten the upper end of the amputated rectum by a few sutures to the lower edge of the wound. 17. Extirpation of cancer of the rectum is, in all cases, rendered easier by diving the posterior wall of the gut as far as the coccyx. Removal of the coccyx is generally unnecessary.

French surgeons are very much opposed to the operation of rectal extirpation, basing their argument chiefly upon the rapidity and malignity of recurrences. Professor Trélat (Paris) mentioned a case where the removal of the cancer early, and when extremely small, was followed by a speedy and malignant recurrence. In another case also, though the operation was normal and extra-peritoneal, he had the small intestines in the artificial anus, and the patient died. Professor Volkman's experience, however, differs very much from that of Professor

Trélat, as he has found even in desperate cases he had no return under long periods, in one case not for ten years.

Mr. H. Cripps, in his treatise on cancer of the rectum, gives the result of his experience of this operation. He found, out of a total of *fifty-three* cases collected by him, *forty-four* recovered and *nine* died, giving a mortality of *seventeen* per cent.; and, quoting from his own personal experience, out of *thirteen* cases operated upon, *eleven* recovered and *two* died, which closely tallies with the former number.

In twenty-two cases I have collected from the medical journals and the Cancer Hospital Case-books, three died from the result of the operation; several lived for a considerable time after the disease was removed, in comparative comfort.

The most important point for surgeons to arrive at is to form some definite rule as to those cases which are suitable for extirpation and those that are not. It has been shown by Professor Esmarch, Billroth, H. Cripps, Volkman, and others, that the disease, under certain circumstances, may be removed with safety, and that the cancer may be permanently eradicated in some cases, and arrested for some considerable time in others.

It is undoubted that the form of cancer which is found in the rectum is, in a large majority of cases, cylindrical-celled epithelioma. It is further established that the lymphatic glands in this disease are not affected until quite late. We may, therefore, fairly lay down the rule, that in all cases of epithelioma of the rectum, if the adjacent structures are tolerably free, and the surgeon is able to pass his finger above the disease, and find healthy mucous surface beyond; if the disease is limited to one portion only, especially the posterior, or, if all round, is not too extensive or too infiltrated into the tissues around or affecting the adjacent vital parts, *i.e.*, the prostate and urethra in the male, and vagina and uterus in the female; if there is no deep ulceration, many fistulæ, and much change of texture; and the patient's health is not too much broken down by age or suffering, and there is no sign of disease being deposited in the liver or other organs, then the surgeon may conscientiously advise his patient to submit to excision of the cancerous mass as giving him the best chance of being freed from the disease, and in any case of his life being prolonged, as there can be no question that if he survive the operation his life will be made considerably more comfortable.

That excision is more successful for diseases of this class than when the cancer is of a gelatinous (colloid) form, the evidence that I have been able to collect strongly confirms. In colloid cancer the submucous tissues become very much earlier infiltrated with the disease; and I am of opinion that in this class of case extirpation should not be attempted, as unless the whole of the disease can be removed it will return with the utmost rapidity, and—here I quite agree with Trélat—with much greater malignancy.

Mr. Bryant is in favour of colotomy in preference to excision of the rectum; but, even in his hands, this operation has proved a very dangerous one. The result of excision has undoubtedly improved, and will do so more as the operation is performed more frequently. The method adopted should be modified to meet the requirements of special cases. It has been argued that the peritoneum in severe cases is very likely to be wounded. I have seen this done on two occasions, but yet the patient has made a good recovery; in one case the peritoneum was stitched together, and in the other a drainage tube was inserted; in neither case was there any protrusion of the small intestines.

Extirpation is often a most tedious and difficult operation in many cases, but it has the great merit of being an attempt, at least, to make a radical cure. Another all-important thing, and not to be overlooked for the comfort of the patient, is the fact that the anus is retained in its normal position, and in some cases the power of retaining the fæces is maintained.

The operation of excision of the rectum was first practised by Faget on the 30th June, 1739; but, so far as we know, was not repeated until 1830, when Lisfranc revived it, and his first three cases were successful; but in his subsequent six, only two recovered perfectly, in one the result was uncertain, and three succumbed in periods varying from twenty-four hours to twenty-five days. After the operation, Velpeau, in six similar excisions, had three recoveries and three deaths; while Rizzoli is reported to have performed the operation four times with uniformly good results. Nélaton had several deaths after the operation, but Czerny is credited with only one death in twenty operations (nine without recurrence) during the last nine years.

The length of the portion of bowel that may safely be removed with any chance of benefiting the patient is a question open to controversy. Mr. Allingham told me he once excised several inches of the gut, opening up the peritoneum, with a favourable result; and there are several cases recorded where five or more inches have been removed; and it is reported that one surgeon excised the first and second parts of the rectum, a part of the urethra, the prostate, and base of the bladder, and that the patient recovered. I do not, however, think any surgeon of the present day would venture to repeat this very heroic treatment.

The mode of operating proposed by different surgeons differs very slightly. I will content myself here with describing what I consider the best method. The patient being placed in lithotomy position, and under an anæsthetic, a sharp-pointed curved bistoury should be passed into the rectum, protected by the forefinger of the left hand, and then, depressing the point, pushing it through the tissues and skin, bringing the point out in the middle line behind, just in front of the tip of the coccyx. The same incision may be made equally well by dividing the skin in the middle line, both in front and posteriorly. The incision should extend backwards as far as the tip of the coccyx, which in some cases may be removed if more room is required. The incision should be carried forward for at least an inch; a circular sweep should then be made round each side of the anus; this, however, should only be carried through the skin and superficial tissues, after which the knife should be put on one side, and the parts separated by the finger and the handle of the scalpel, or some such blunt instrument, with an occasional snip with a pair of blunt-pointed scissors. A good plan, as it appears to me, is one that has been suggested by Professor Macleod; he says: "It is a great help to insert four strong whipcord loops with a curved needle, one at each corner as it were (two above and two below), passing from the incision into the interior of the bowel and out at the anus. By knotting the free ends of each of these four ligatures four loops are made, which give one great power in the subsequent separation of the gut, and when all are united in the left hand and drawn upon, the bowel can be well stretched and steadied, and so the later steps of the operation much facilitated." The separation of the gut posteriorly is very easy, as the finger readily breaks down the cellular bed, but anteriorly the gut is very much more intimately attached, and when adhesion exists the blunt-pointed scissors must be had recourse to; when doing this part of the operation, a catheter should always be passed into the bladder in the male, and the finger introduced into the vagina in the female; by this means the parts are steadied, well defined, and the surgeon is enabled to dissect the diseased tissues away without fear of wounding either the urethra in the one case, or the vagina in the other. There is usually in this way very little difficulty in separating the bowel to a point well above the disease. Up to this point there is usually very little hæmorrhage; if there should be, the application of the clamp forceps will always enable the surgeon to proceed without hindrance. Further, if it is remembered that the main artery lies in the posterior wall of the bowel, it must be manifest that no serious bleeding can take place until the gut is divided transversely. During the latter part of the operation great assistance may be rendered by an assistant keeping the detached portion of gut upon the stretch by means of the strings in any direction the surgeon may require. The only fear of hæmorrhage being troublesome is when the bowel is adherent tolerably high up posteriorly, as the main blood-vessels divide at a point about four inches from the rectum; but here, if the posterior incision has been made freely, there should be no difficulty in securing the bleeding points. Dupuytren recommends, in operations which involve carrying the dissection very high, that the bladder should be filled so as to raise the recto-vesical pouch.

In separating the diseased portion of the bowel from the healthy parts the écraseur or thermo-cautery may be used; if the écraseur is used the bowel should be divided longitudinally into two parts, so as to avoid the temporary closure by the action of the chain; but this is not at all necessary, as the hæmorrhage is usually insignificant, and in any case it is easy, if dividing it with scissors by successive snips, to catch up the vessels directly they are cut, and ligaturing them. The wound should be swabbed out with a solution of chloride of zinc, and if there be any oozing, a sponge soaked in boiling water and pressed on the part will quickly stop it; in any case, a sponge placed in the wound and pressed firmly home, while the patient's legs are brought down and tied together, will invariably stop all bleeding. The patient should be put to bed, and his buttocks somewhat raised upon a pillow. No dressing of any sort should be used, excepting, perhaps, a large pad of marine lint to catch any discharge, either fæcal or otherwise; the patient should have small doses of opium, and the parts kept thoroughly well irrigated with Condy's fluid or weak solution of carbolic acid, and the wound itself dusted over with iodoform after each dressing. The patient should be fed upon food which is nourishing and easily assimilated, the peptonized beef tea, oatmeal gruel, milk, eggs, and the like. The bowels should be not allowed to act for four or five days or a week. If there is any difficulty in micturition, the urine should be drawn off with a soft gum-elastic catheter.

It sometimes happens that the disease is localized to a portion of the rectum situated two inches or two and a-half inches above the anus, a strip of perfectly healthy mucous membrane existing between the tumour and the anus. In these cases the surgeon should endeavour to preserve the anus and sphincter muscles; this is done by forcibly dilating the anus, and then making a deep incision in the middle line posteriorly to the tip of the coccyx, the incision being prolonged up the bowel to the lower margin of the disease. A corresponding incision may be made anteriorly if required.

The bowel should then be divided transversely throughout its entire circumference below the tumour; all bleeding points at once caught up with the pressure forceps, and tied if the forceps are in the way, or these may be left on for the purpose of making traction and assisting in separating the tumour from the parts surrounding the bowel. Should the vessels be tied, I should recommend the whipcord being passed through the bowel for the sake of traction, as described for the removal of the whole rectum. The after steps of the operation and treatment are identically the same as for complete excision.

When the tumour involves only a portion of the circumference of the bowel there will be no occasion to remove the complete ring of the rectum. The operation is commenced in the same manner as the last-named operation, and then, starting from the upper end of the incision, the diseased part is to be separated from the surrounding tissues by tearing with the finger or handle of the knife, and an occasional snip with blunt-pointed scissors, until the whole diseased mass is detached, being careful to prolong the incision into the healthy tissues around the disease for at least an eighth to a quarter of an inch.

If the portion removed be small, the edges may be brought together with sutures placed longitudinally; if large, an attempt should be made to approximate the edges, the sutures being passed through the entire thickness of the gut. The ligatures may be left to slough out. After all these operations the wounds heal with remarkable quickness, and there is a great tendency for the cicatricial tissue to contract so as to allow of but a very small passage. In all these cases a hollow cylindrical tube should be passed well through the wounded parts into the healthy bowel. In the early stages a tallow candle gently passed will often prevent this contraction from occurring. It is remarkable after these operations how little deficiency there is in the parts, and in the functions of the sphincter. Some very excellent rectal bougies have been lately introduced by Mr. Wales, of Canada; they are made of very soft pliable rubber, and are admirably adapted for the purpose of either dilating stricture of the rectum or for use after excision, as a patient might easily pass them without fear of injury. The rectum should be syringed out twice or thrice a day with some antiseptic solution, and the patient otherwise treated as in the former cases.

The operations which are to be practised for giving relief to the sufferings of the patient are colotomy and the opening of the sigmoid flexure in the left groin. Both these operations are the source of the greatest possible comfort to the patient, as it prevents the passage of the fæces and acrid secretions over the diseased part, and thus the progress of the disease is, I think, often retarded.

Of the two operations, I personally prefer the forming of an artificial anus in the iliac region, for the following reasons:—

1. It is very much more handy for the patient; he can attend to himself and keep the parts thoroughly cleansed without seeking aid from others.

2. A pad in the form of a large truss can be very easily applied, and so the escape of fæces be prevented.

3. There is no greater risk to the patient in this operation than there is in colotomy.

This operation should be conducted on the method suggested by Mr. Howse for the performance of gastrostomy, *i.e.*, they should be divided into two parts. In the first part the gut should be brought out of the wound, and the visceral and parietal peritoneum carefully approximated by a number of fine carbolized silk sutures; the parts should then be well dusted with iodoform, and dry dressing applied. On the fifth or sixth day the bowel may be opened without any fear of peritonitis being set up by the escape of the fæces into the peritoneal cavity or the cellular tissues around the wound.

Mr. Davies Colley reported three cases of left lumbar colotomy in which he had adopted this method, and claimed for it that the risk of peritonitis, or of suppuration in the planes of the connective tissues, was very much diminished by delaying the opening of the gut, until the deeper part of the wound had had time to be sealed by reparative lymph.

The chief difficulty he found was to find a mode of securing the protruding bowel in such a way as to avoid extravasation of its contents or strangulation of its walls. This he satisfactorily effected by means of a clamp consisting of two steel bars, upon which were placed rounded ivory studs about half-an-inch apart. Upon approximating the steel bars by means of screws near their extremities, the two pairs of ivory studs could be made to hold the coats of the bowel at two points. At the first dressing the screws could be relaxed or the clamp might altogether be removed.

In all cases of operation under discussion I am inclined to think the better method is to draw a complete loop of intestine out of the wound, and after a lapse of four or five days, when the deeper parts had become thoroughly and firmly fixed by reparative lymph, to remove this loop of intestine, and thus insure a more perfect and complete artificial anus, and prevent the possibility of any of the fæces being conveyed into the lower portion of the gut, and so doing away with the benefit which the operation was to a great extent performed to relieve, viz., the passage of the acrid secretion over the diseased surface. It must, however, be remembered that in many cases the delay necessary for the performance of this form of operation is impossible, as the patient requires immediate relief from most urgent symptoms of obstruction of the bowels; in these cases, then, the old form of at once opening the bowel must be resorted to.

Before describing the operation for opening the colon, I think it will be well to give a short account of the anatomical connections of the colon and sigmoid flexure; and for this purpose I cannot do better than quote largely from the Hunterian lecture delivered by Mr. Treves at the Royal College of Surgeons in the year 1885, on the "Anatomy of the Intestinal Canal and Peritoneum," to which I would direct my readers for further details, and strongly recommend them to read, for in connection with the operation of colotomy or the opening of the sigmoid flexure in left iliac region, the researches of Mr. Treves are of the greatest possible value. After describing certain variations in position and form of the cæcum, and comparing the formation in man and some of the lower animals, he goes on to say:—*

"It will now be convenient to consider the relations and connections of the cæcum; and here I might at once state that the result of my investigations upon this point is entirely at variance with the statements contained in the anatomical textbooks.

"When the abdomen is opened shortly after death, while the rigor mortis is still present, and before the intestines have become distended by the gases of decomposition, and so displaced, it will be found that the cæcum is usually lying upon the psoas muscle, and so placed that its apex or lowest point is just projecting beyond the inner border of that muscle.

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* "British Medical Journal," 1885.

"In the great majority of instances the apex of the cæcum corresponds with a point a little to the inner side of the middle of Poupart's ligament.

"In a great number of cases the cæcum is entirely clear of both psoas and iliacus muscle, and hangs over the pelvic brim, or is lodged entirely within the pelvic cavity. In eighteen instances I have found the cæcum in this latter situation, lying sometimes directly upon the pelvic floor, or placed in contact with the upper surface of the bladder or uterus, or wedged in with the sigmoid flexure, or lying actually in cantact with the left wall of the pelvic basin. It cannot be said to be exceedingly unusual to find that some part of the cæcum has just passed to the left of the median line of the body. Now, in every instance that I have as yet seen, the cæcum has been entirely enveloped on all sides by peritoneum, and has been free in the abdominal cavity."

* * * *

"The mobility of the cæcum is often considerable, and depends in the main upon two conditions—either upon the length of intestine that extends between the tip of the cæcum and the reflection of the peritoneum above alluded to, or upon the presence of an ascending mesocolon. The former factor is of greater moment than the latter. In eleven bodies I have met with cæca that could be made to touch the under surface of the liver, and any part of the left side of the pelvis. In some of these specimens the cæcum might very well have occupied an inguinal or femoral hernia on the left side, had the hernial orifice been large enough. In one case the tip of the cæcum could be made to touch the xiphoid cartilage, and in several instances the mobile piece of intestine could be drawn down the thigh to the level of the great trochanter."

* * * *

"The descending colon is the part of the large bowel that is least liable to variation."

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"Considerable importance attaches, from a surgical point of view, to the frequency with which a mesocolon may be anticipated in connection with the vertical parts of the large intestine. With this anatomical circumstance the operation of lumbar colotomy is very intimately concerned. The usual statement made in surgical text-books upon this subject is to the effect that a mesocolon is more often found upon the right side of the body than upon the left; and this statement is used as one argument in support of left lumbar colotomy. I made a careful examination of the peritoneal investments of these parts of the colon in the 100 subjects dissected, with the following result. In 52 bodies (that is, in about one-half) there was neither an ascending nor a descending mesocolon. In 22 there was a descending mesocolon, but no trace of a corresponding fold on the other side. In 14 subjects there was a mesocolon to both the ascending and the descending segments of the bowel; while in the remaining 12 bodies there was an ascending mesocolon, but no corresponding fold on the left side. It follows, therefore, that, in performing lumbar colotomy, a mesocolon may be expected upon the left side in 36 per cent. of all cases, and on the right side in 26 per cent."

Sigmoid Flexure.—Mr. Treves does not agree with the usual description of the sigmoid as given in the text-books, in fact he says he has never met with such a sigmoid flexure, or such a rectum; and he goes so far as to state that the flexure does not occupy the iliac fossa, that its mesocolon does not arise wholly from that fossa, that its course is not that of either the letter S or the letter Σ, and that the first part of the rectum is not disposed in the manner familiarly described. The segments of gut termed the sigmoid flexure and the first part of the rectum form together a simple loop that cannot be divided into parts.

This loop begins where the descending colon ends, and ends at the commencement of the so-called second piece of the rectum; at the spot, in fact, where the mesorectum ceases, opposite about the third piece of the sacrum. This loop, when unfolded, describes a figure that, if it must be compared to a letter, may well be compared to the capital Omega. If, at any time, new terms should be introduced, it might be well to call all that segment of the bowel between the ending of the descending colon and the ending of the mesorectum the omega loop, and to limit the term "rectum" to the short piece of practically straight gut that is now described as the second and third parts of the rectum.

" The length of this sigmoid or omega loop in the fœtus has been already mentioned. Its average length in the adult is 17½ inches. Taking the average in all the specimens examined, the most usual arrangement of the omega loop, when *in situ*, is the following. The descending colon ends just at the outer border of the psoas. The gut here suddenly changes its direction. It crosses the muscle at right angles, and about midway between the lumbo-sacral eminence and Poupart's ligament. It now descends vertically along the left pelvic wall, and may at once reach the pelvic floor. It then passes more or less horizontally and transversely across the pelvis from left to right, and commonly comes into contact with the right pelvic wall. At this point it is bent upon itself, and, passing once more towards the left, reaches the middle line and descends to the anus. It will lie, therefore, in more or less direct contact with the bladder and uterus, and may possibly touch the cæcum. It is in very close relation with the coils of small gut that occupy the pelvis, and by these coils the loop is usually hidden."

It will be seen, therefore, from Mr. Treves' observations, that the old and familiar argument for performing colotomy on the left side in preference to the right for the reason that a mesocolon is more frequently met with on the right side than the left, completely breaks down; in fact, the direct opposite is the case, he finding on careful examination of 100 cases that the mesocolon was present in 36 per cent. on the left side and only 26 per cent. on the right. This being the case, the danger of performing right colotomy, instead of being more dangerous, should be decidedly less so; and further, this being so, would it not be more prudent for the surgeon, in all cases where it is doubtful how high the cancerous mass is in the colon, to at once perform colotomy on the right side? Certainly, in my opinion, such should in future always be done first, for the reason already described; and, secondly, that by so doing the bowel is opened very much further from the disease, and therefore much less likely for its coats to be infiltrated by the disease.

Mr. Treves' account of the sigmoid flexure is even more condemnatory of the accounts given in the text-books. He says the average length of the flexure is 17½ inches; and from his observations undoubtedly, when the bowel is opened in the left groin, the flexure is opened very nearly at its commencement, viz., nearly 17 inches from the middle portion of the rectum. This being so is another strong argument in favour of Littré's operation being performed in all cases of cancer of the middle or lower portion of the rectum, in preference to colotomy in either loin.

Operations.—Littré's may be performed on either the right or the left side. In the right the cæcum may be opened, and on the left the sigmoid flexure. Undoubtedly the latter operation is only suitable in diseases of the middle and lower part of the rectum; if the disease extends above this, either right or left, lumbar colotomy should be performed, or the cæcum opened, and an artificial anus made in the right iliac region.

As I have pointed out before, the intestine above the seat of cancer is very liable to become ulcerated, and sometimes these ulcers extend for a considerable distance up the bowel; it is all-important, therefore, to open the gut as far from the disease as practicable.

The operation for opening the sigmoid flexure in the left loin was proposed by Littré in the year 1710, and the operation has always been known by his name, but it was not actually performed until the year 1776, when a surgeon named Pillore, of Rouen, first made an artificial anus in the adult for the relief of retention of fæces. He did not, however, follow Littré's suggestion of opening the sigmoid flexure, but made an artificial anus in the right iliac region, by opening the cæcum.

In 1797 Fine, of Geneva, opened the transverse colon, and formed an artificial anus in the umbilical region in a case of cancer of the rectum.

The method of performing the operation is as follows: The patient being fully under the influence of an anæsthetic, and placed in a recumbent position, the surgeon proceeds to make an incision from two and a-half to three inches in length, parallel to Poupart's ligament, about two fingers' breadth inside the anterior superior spine of the ilium. Having divided the skin, superficial tissues, and muscles, the peritoneum is brought into view; all bleeding points are to be secured with the pressure forceps, and before opening the peritoneum any arteries that may be divided should be ligatured. Having thus arrested the hæmorrhage, a piece of the peritoneum should be pinched up by the dissecting forceps and the cavity opened, a director introduced, and the peritoneum divided the whole length of the wound. In performing these steps of the operation the only artery likely to be divided is the circumflex iliac, but, as a rule, this escapes injury.

The abdominal cavity being opened, the surgeon now introduces his index and middle fingers into the wound, and searches for the sigmoid flexure on the left, or the cæcum on the right side; the former is usually readily found just where it passes into the cavity of the pelvis. Often, however, the small intestine pushes into the wound, and it is difficult to find the flexure. In every case, therefore, the surgeon should carefully examine the piece of gut, to be certain he has not caught up a portion of the small intestine by accident.

The large gut is easily distinguished. Not only is it larger, but it always has the characteristic longitudinal bands present. When opening the right flank in search of the cæcum, the difficulty is usually not nearly so great; although occasionally, as Mr. Treves has pointed out, the cæcum is often much displaced.

In either case, the operation should be divided into two parts. In the first, after the gut is exposed and stitched to the wound, the parietal and visceral coats of peritoneum having been brought accurately into apposition, care being taken in passing the sutures through the bowel that they only pass through the peritoneal and muscular layers. The wounded surface should be dusted over with iodoform and dressed with one of the antiseptic gauzes, thymol, carbolic acid, or the like. In this way the operation is shorn of the greater part of its danger. The wound should not be disturbed for about five days, during which period the patient should be fed on the most digestible and easily assimilated foods. On the fifth day the surgeon may proceed to open the bowel by a simple linear incision. The wound should now be dressed with simple pads of marine lint. The mucous membrane of the bowel, after this operation, often has a great tendency to prolapse. Care should be taken, therefore, that a firmly-fitting bandage is applied; and when the patient is sufficiently recovered, a truss, fitted with a hollow india-rubber pad, should be carefully fitted over the opening.

One great objection to this method of forming an artificial anus is that a quantity of fæces is liable, after the operation, to pass into the lower portion of the bowel, and thus tends to keep up the irritation of the diseased surface, which was one of the objects of performing the operation. Madelung has recently proposed in lumbar colotomy to cut the colon entirely across, stitching the upper edges to the abdominal wound, and so establish an artificial anus. He then empties the lower portion of the gut of its contents, stitches the cut ends together, and returns it into the wound. This modification might well be extended to operations for opening the sigmoid flexure, care, of course, being taken to empty the lower portion of the gut, and also to bring the intestine well out of the wound before dividing it.

The same could scarcely be done with the cæcum, unless it was one of those cases in which a long mesocæcum was present.

Surgeons, until quite lately, have been somewhat timid of performing these operations, owing to the great risk of exciting peritonitis; but since the introduction of the dual operation in the case of gastrostomy with such a marked reduction in the mortality in that operation, they have become more and more in favour of opening the colon in the iliac region. It was in the year 1796 that Callisen, to overcome the objection of wounding the peritoneum, proposed opening the descending colon in the left lumbar region, where it was not covered with peritoneum. It, however, did not find favour with surgeons generally; and it was not until Amussat, when attending the celebrated Broussais for cancer of the rectum, of which he died, was led to make experiments on the dead body with the view of discovering the best method of opening the colon for the formation of an artificial anus in cases of obstruction of the intestines, that he became convinced that the operation suggested by Callisen was, with certain modifications, not only practicable, but safe. In the year 1839 he first performed this operation of left lumbar colotomy, the patient making a good recovery.

Colotomy. Left Lumbar.—The patient being placed under the influence of an anæsthetic, and lying upon his right side, with a pillow or sand-bag under the right flank, between the ribs and crest of the ileum, so as to render the left loin tense and prominent, a spot a good half-inch posterior to the centre of the crest of the ileum, measured between the two superior spinous processes, is to be marked. A slightly oblique incision should be made from the last rib towards the anterior superior spinous process of the ileum ; and the centre of this cut, which should be quite four inches in length, must be opposite the mark upon the crest. The structures must be carefully divided upon a director, and all bleeding points at once caught with the pressure forceps. I think it desirable that the fascia lumborum should be recognized, and if possible, the edge of the quadratus lumborum muscle clearly exposed. If this is seen, a blunt-pointed bistoury may be passed beneath it, and the muscle freely divided. When this is done the colon will be found, generally covered with fat. It is most important that all the deep structures should be divided to the full extent of the wound, otherwise the surgeon will find himself digging at the apex of a triangle, and will have great difficulty in recognizing anything at the bottom of the wound. The dissection must now be carried very carefully through the fine layers of areola-adipose tissue which lie immediately upon the intestine. When the patient is fat, this is loaded with adipose tissue. When thin, it is semi-transparent and membranous, closely resembling peritoneum.

After dividing these, the colon will usually readily present itself, and may at once be recognized by its greenish colour and distended appearance. The operation may then be completed by passing a tenaculum, or a needle armed with silk, into the most projecting part of the gut, and by this means drawing it to the surface of the wound in order to prevent it dropping or shrinking back when opened.

Mr. Bryant has shown that the colon when thus exposed is capable of being withdrawn through the wound for some four or five inches. In most instances when this can be done I would strongly advise that a knuckle or loop should be drawn quite clear out of the wound, and fastened as suggested by Mr. Davies Colley, so as to allow the gut to become thoroughly adherent to the wound before the artificial anus is made, at the expiration of some four or five days.

Should, however, the symptoms be so urgent as to demand immediate relief, I would still draw some two or three inches of the intestine through the opening as suggested by Madelung, and having thoroughly protected the wound with sponges, divide the colon across its whole diameter, then wash out the lower segment, stitch up the opened ends, and return it into the cavity, and then proceed carefully and accurately to stitch the open end of the upper segment to the edges of the wound with numerous silk interrupted sutures. The parts should then be dressed with a large pad of marine lint, and the patient returned to bed.

In some cases the colon is very difficult to find, especially in cancer of the rectum, the gut being but little distended with either fæces or gas. In such cases, often the colon recedes behind the quadratus lumborum muscles, and the folds of peritoneum nearly surround and invest it. This difficulty may be overcome to an extent by throwing into the rectum a large bland enema, or pumping in air.

The operation for opening the ascending colon on the right side must be conducted upon exactly the same lines as those laid down for left lumbar colotomy.

Prognosis after Operation of Colotomy.—Erckelen has collected a total of 262 cases in which the colon was opened, viz.: Amussat's method, 165; Littré's, 84; method unknown, 13. Of these 262 cases, 110 were operated upon for stricture the result of carcinoma; in 83 of these the gut was opened by Amussat's method, of which 52 ended favourably and 31 unfavourably. In 23 cases Littré's operation was performed, of which 14 ended favourably and 9 unfavourably. The remaining four were operated upon by unknown methods; one of these died and three recovered.

From these statistics it will be seen that lumbar colotomy is slightly more favourable than Littré's operation; in the one 63·9 per cent. of cases end favourably, while in Littré's operation only 61·0 per cent. recovered. This difference is so slight, however, that it is scarcely worth notice, and when it is taken into consideration the extra comfort the patient receives from the latter operation, I think it is quite worth the extra risk. Moreover, by dividing the operation into two parts the risk of peritonitis is very much reduced in Littré's operation than when Erckelen's statistics were taken.

In seventeen cases of colotomy I have collected, three died within a very short time of the operation.

Conclusions.

First.—If the disease is limited in extent to the lower portion of the rectum within two and a-half inches of the anus, and the finger can be passed well above the growth, the mucous membrane being found to be healthy, excision of the cancerous mass should be practised.

Secondly.—When a strip of healthy mucous membrane lies between the tumour and the anus, and the tumour is found to be limited in extent, and the mucous membrane above the tumour healthy, then the anus should be forcibly dilated and the diseased portion of rectum removed, leaving the sphincters and lower portion of mucous membrane; the lower end of the upper segment being finally attached to that of the lower by silk sutures. and drainage entirely external to the rectum and anus provided for.

Thirdly.—When the tumour involves only a portion of the circumference of the rectum, the diseased portion only of the bowel must be removed. If the gap left is a small one, it may be sutured together longitudinally, but if it is a large one, the line of union should be crucial, the four corners at the crossing being held together by a stout silk suture. This suture, like all others, may be left to slough out. Drainage must be provided for in these cases.

Fourthly.—When the disease extends beyond the limits mentioned in the first and second corollary, then colotomy, either in the right or left loin, or Littré's operation as already described, must be performed.

Table of Cases of Cancer of the Rectum.

No.	Nature of Growth.	Age.	Sex.	Nature of Operation.	Duration of Disease.	Result.	Authority.
1	Sch.	61	F.	Five inches excised, edges of wound carefully stitched to skin	1 year	Recovered. Well 9 months after operation	Lancet, vol. i, 1885, p. 27.
2	Melanotic sarcoma	60	F.	Excision of 3 inches of gut	11 months	Recovered	Lancet, vol. i, 1885, p. 65.
3	Sch.	46	F.	Excision of rectum	9 months	Recovered	Lancet, vol. i, 1885, p. 561.
4	Ep.	39	M.	Colotomy, left lumbar	2 years	Recovered	Lancet, vol. i, 1884, p. 204.
5	Ep.	62	M.	Colotomy, left lumbar	7 months	Recovered	
6	Ep.	35	M.	Colotomy, left lumbar	2 years	Recovered	
7	Ep.	68	M.	Excision 3 inches, excepting anterior fourth	2 years	Recovered. Alive 1 year after operation	Clinical Society's Report, 1884.
8	Ep.	60	F.	Excision 4 inches	....	Recovered. Well 1 year after	
9	Ep.	40	F.	Excision 2 inches	....	Recovered. Well 1 year after	
10	Sch.	32	F.	Excision, followed by colotomy 7 months later	3 months	Recovered. Well 13 months after first operation	Lancet, vol. i, 1884, p. 1028.
11	Sch.	48	M.	Colotomy, left lumbar	....	Recovered	
12	Sch.	37	M.	Colotomy, left lumbar	18 months	Recovered	
13	Encep.	59	F.	Colotomy, left lumbar	....	Died 19th day	
14	Sch.	48	F.	Colotomy, left lumbar	12 months	Recovered	Lancet, vol. ii, 1884, p. 500.
15	Ep.	64	F.	Excision	2 years	Recovered. Recurred 2½ years after removed, and again recovered	Lancet, vol. ii, 1884, p. 815.

No.	Nature of Growth.	Age.	Sex.	Nature of Operation.	Duration of Disease.	Result.	Authority.
16	Ep.	45	F.	Colotomy	12 months	Recovered	Lancet, vol. i, 1883, pp. 313 and 358.
17	Ep.	50	M.	Partial excision	....	Recovered	
18	Ep.	67	M.	Colotomy, left lumbar	....	Recovered	
19	Ep.	69	M.	Colotomy, left lumbar	18 months	Recovered	
20	Ep.	34	M.	Excision of disease, and colotomy	5 months	Recovered	
21	Ep.	62	F.	Colotomy, left lumbar	2 years	Recovered	
22	Ep.	68	M.	No operation	....	....	
23	Ep.	77	M.	No operation	....	....	
24	Ep.	48	F.	Excision	4 years	Recovered	Lancet, vol. ii, 1882, p. 528.
25	Not mentioned	15	M.	Colotomy, left lumbar	3 months	Died 3 months after	
26	Ep.	50	F.	Excision	6 months	Recovered	Lancet, vol. ii, 1881, p. 502.
27	Ep.	....	F.	Colotomy, left lumbar	....	Recovered	Lancet, vol. ii, 1880, p. 892.
28	Ep.	64	M.	Excision	....	Recovered	Lancet, vol. ii, 1880, p. 540.
29	Ep.	27	F.	Colotomy, left lumbar	7 months	Died 2 months	Lancet, vol. i, 1880, p. 13.
30	Ep.	31	F.	Colotomy, left lumbar	5 months	Recovered	
31	Ep.	17	M.	Colotomy, left lumbar	....	Recovered	
32	Ep.	20	F.	Colotomy, left lumbar	....	Recovered	
33	Ep.	60	F.	Excision	18 months	Recovered	Lancet, vol. ii, 1878, p. 293.
34	Ep.	60	F.	Excision	12 months	Recovered	Lancet, vol. i, 1879, p. 370.
35	Sch.	70	F.	Excision	9 months	Recovered	
36	Ep.	52	M.	Excision	11 months	Died	
37	Ep.	71	M.	Excision	18 months	Recovered	Cancer Hospital Case-books.
38	Ep.	54	F.	Excision	9 months	Recovered	
39	Ep.	48	M.	Excision	....	Died	
40	Ep.	55	M.	Excision	....	Died	
41	Ep.	53	F.	Excision	10 months	Recovered	
42	Ep.	49	M.	Excision	9 months	Recovered	

CASES.

Case I.—*Epithelioma involving the whole of the Lower Lip. Removal of growth and the formation of a new Lip by the Author's Operation. Recovery with a good Lip.* Under the care of the Author.

T. W., aged 58, was admitted into the Cancer Hospital on the 5th March, 1885, suffering with a large cancerous ulcer implicating the whole lower lip and left angle of the mouth.

Previous History.—Has suffered much from gout. Four months ago noticed a small pimple like a "boil" on his lower lip at the left-hand corner, which increased rapidly. Patient is a gas-fitter, and is in the habit of using a brass blow-pipe. He is also a great smoker. No history of syphilis. Has been rather a hard drinker.

Present State.—Almost the whole of lower lip is the seat of a sprouting epithelial mass, very vascular, readily bleeding, with deep indurated base extending deeply into the substance of the lip, and hard everted edges. There is an enlarged gland in the submaxillary region about midway between the symphysis menti and angle of the jaw. The left ala of the nose has been ulcerated; this was removed by Mr. Holmes, at St. George's Hospital, some twelve years ago, and now presents a firm healthy cicatrix. There is a slightly ichthyotic condition of the tongue.

Operation.—On the 10th March, the patient being placed under the influence of ether, I made two incisions, the one extending from the left angle of the mouth to the point of the chin, and the other starting at about half-an-inch from the right angle of the mouth, meeting the first incision at the chin, thus forming a triangular flap; this was speedily dissected from the surrounding tissues, thus removing all the diseased structures. Another incision was now made from the left angle of the mouth downwards to a point midway between the angle of the jaw and the symphysis, forming a flap of triangular shape, with its base exactly the same length as the first; this flap was now twisted round, and the two raw edges united with hare-lip pins, the posterior free surface forming the new lip. The gland under the jaw was now removed, and the other raw edges united by means of a few interrupted wire sutures and intermediate horsehair sutures.

The mucous membrane and skin of the newly-formed lip were carefully united by a continuous horsehair suture, and the whole, after being painted over with collodion, dressed with salicylate wool.

The man made a good recovery and had a capital lip.

CASE II.—*Epithelioma implicating three-fourths of the Lower Lip. Syme's Operation for Renewal of Lip. Satisfactory Results.* Under the care of the Author.

G. H., aged 80, was admitted into the Cancer Hospital, January 1886, under the care of the author. Occupation, blacksmith.

Previous History.—Has been a great smoker, usually smoking a short clay pipe; has frequently burnt his lip with the hot pipe. Fifteen months previously to admission noticed a small pimple on lower lip, which ulcerated, and although he sought advice for this, it continued to increase until it extended along the whole of lower lip to the left angle of the mouth, which became implicated with the disease.

Present State.—A large ulcerated mass is seen to occupy the lower lip from about a quarter of an inch from the right angle to the left angle of the mouth, which is also ulcerated. The ulcer presents all the characteristics of epithelioma—eroded surface, everted edges, and hardened base. There is one gland which is slightly enlarged under the jaw. The old man being in very good health, and the glandular mischief so limited, it was decided to remove the disease, and form a new lower lip after the method recommended by Syme.

Operation.—The diseased mass having been removed by a sweep of the knife, two semicircular incisions were made extending from the centre of the chin to anterior edge of the masseter muscle of the jaw on each side, care being taken not to divide the facial arteries. The flaps thus formed were dissected up, and the enlarged gland removed; the top of the anterior edges of these flaps were now brought up to a level of the mouth and the edges fastened together by three hare-lip pins. The lower edges were then united with horsehair sutures, and the wound dressed with salicylate wool. The wound healed readily and well, the pins being removed on the fourth day, and a capital new lip was thus formed. The man, however, died three weeks after the operation from cerebral symptoms.

CASE III.—*Epithelioma of Upper Lip involving Right Ala of Nose. Leidillot Operation. Recovery with a capital new lip.* Under the care of the Author.

T. P., aged 51 years, admitted into the Cancer Hospital on the 17th September, 1885, under the care of the Author. Occupation, labourer.

Previous History.—About six years ago first noticed a small sore on his lip, which remained stationary for some considerable length of time, sometimes healing, at others "breaking out" and becoming ulcerated. About eighteen months ago it commenced to increase rapidly, quickly invading the whole lip and extending into the right nostril. Had syphilis when a young man, no distinct history of secondary affection.

Present State.—The whole of the upper lip is the seat of cancerous ulceration extending to the nares; the right ala of the nose is also completely destroyed, as also a portion of the cheek. The ulcerated surface presents an uneven papillomatous appearance, readily bleeding on the slightest irritation; the base is hard and indurated, and edges somewhat raised and everted. The lower lip is quite free from disease. No enlargement of the submaxillary glands.

His chin is drawn completely down and fixed by old cicatricial bands, the result of an ulcerated condition that had been present some years ago.

Operation.—The patient being placed fully under the influence of an anæsthetic, I proceeded to remove the whole of the diseased tissues quite to the bone, and the entire soft parts of the nose as high as the nasal bone on the right side, so as to be well beyond the disease. All bleeding points being secured by means of the clamp forceps, I proceeded to form the flaps which were to constitute the new lip. This was done after the method recommended by Leidillot, by extending two parallel incisions at either side of the mouth as low as the lower edge of the inferior maxilla, the distance between them being fixed by the depth of the lip required; another incision at right angles to, and connected with, the lower extremities of these incisions, was next made, and the flaps thus formed, dissected up, were twisted upon themselves and united in the middle line by hare-lip pins and twisted suture. The raw surfaces resulting from the removal of these flaps were likewise united by hare-lip pins, and a few interrupted silver wire and horsehair sutures completed the operation. The edges were painted over with collodion, and the whole dressed with lint soaked in carbolic oil.

A little suppuration occurred in the wound, which, however, ultimately healed very well, and an excellent lip resulted, and he was discharged six weeks after the operation.

Case IV.—*Epithelioma of the Floor of the Mouth, implicating the Symphysis Menti. Removal of the Symphysis and Floor of Mouth. Recovery.* Under the care of the Author.

I. L., ætat 63, a Chelsea pensioner, was admitted into the Cancer Hospital on the 20th August, 1883, suffering from epithelioma of the anterior part of the lower jaw, the disease corresponding in extent with the incisor and canine and first left bicuspid teeth, extending along the floor of the mouth, as far back as and implicating the frænum of the tongue, the sublingual gland being also affected.

Previous History was as follows:—About three months before admission he noticed a small swelling near the left lower canine tooth, for which he had the tooth extracted. The swelling, however, increased, and he suffered great pain. The submaxillary gland on the right side shortly became enlarged, and the growth increased rapidly along the gum and floor of mouth. He was a great smoker. There was no history of any hereditary tendency or syphilis.

Present State.—Gums spongy and unhealthy, several stumps of teeth as well as the teeth themselves are loose, the alveolar process being evidently eaten away by the growth, which extends under the tongue; it is chiefly situated on the left side of the jaw, from the bicuspid tooth on the left side to the canine on the right side, implicating the frænum of the tongue and mucous membrane of the floor of the mouth. The sublingual gland is enlarged and indurated. The submaxillary gland on the right side is enlarged and painful.

On the 28th August the man was placed under the influence of ether, and I endeavoured to remove the growth with the gouge and chisel, but it was so deeply implicated in the jaw that I found it necessary to remove a portion of that bone. This I did by dividing the lower lip in the middle line to the chin, and dissecting the soft parts from the bone, and sawing through the jaw on the left side at the second bicuspid tooth, and on the right side at the canine tooth, I detached the piece of bone, and proceeded to clear the floor of the mouth of the diseased structure.

There was some free hæmorrhage, which was, however, easily controlled. I brought the lip together with hare-lip pins, but did not attempt to bring the two ends of the maxilla together.

This man did well. I had his mouth kept constantly sponged out with a weak solution of carbolic acid lotion—one in sixty—and he was fed with beef tea.

The interval between the ends of the bones speedily filled up with good, healthy tissue, which was, however, somewhat retarded by the ends of the bones necrosing.

The sequestrum was, however, thrown off in a few weeks, since which time the man has made a good recovery. The submaxillary gland, which was enlarged, and which it was deemed unadvisable to touch at the time of the operation, gradually got smaller, and I do not anticipate any further trouble from this quarter. The man is now convalescent, and has much improved in general health.

The diseased mass was found on microscopical examination to be epithelial in character, and the parts nearer to and which implicated the bone had a large number of spindle cells mixed with the fibrous tissue.

CASE V.—*Epithelioma of Left Half of Lower Maxilla, implicating Left Tonsil. Removal of half Lower Jaw. Death fourteen days after operation.* Under the care of the Author.

E. I., ætat 69, epithelioma of the left half of lower maxilla implicating the left tonsil, the left half of soft palate and the left side of root of tongue, also a small patch on the posterior wall of the pharynx.

Previous History.—The man first noticed, five or six months previous to admission, a soreness on the inside of his cheek, also some slight tenderness on swallowing hard food. The disease gradually increased for two months, when he found himself unable to swallow any hard food at all.

Has been a great smoker. Has never had an injury to the jaw. Pain at present very slight, and no great difficulty in taking soft food or slops.

No family history of cancer. No history of syphilis.

Submaxillary glands on left side enlarged and tender.

Examination with laryngoscope. General redness of pharynx, papilla on back of tongue enlarged, left tonsil, cheek, and part of soft and hard palate generally matted together.

Seeing that the disease was pretty well limited to the parts mentioned, that the man was rapidly losing strength and flesh, and the difficulty he had to swallow, it was deemed quite justifiable to excise the half of the jaw and other diseased parts.

On the 18th September he was put under the influence of ether, and an incision made through the lower lip in the middle line to midway between the chin and hyoid bone, another incision being carried from this point along the lower edge of the jaw, extending as high as the articulation with the temporal bone. A strong whipcord ligature was then passed through the tongue and given to an assistant to hold. The flap formed by the primary incision was dissected from the bone and turned up, the jaw being divided in the middle line was detached from the soft parts and speedily disarticulated.

The facial and other arteries were secured by Well's forceps as divided. I then with a gouge forceps removed a portion of the hard palate and alveolar process of upper maxilla, and cut away with scissors the tonsil and soft diseased part of the palate. The bleeding, which was rather free here, was arrested by the application of Paquelin's cautery, and the small patch of disease on the posterior wall of the pharynx was also destroyed by the cautery. I next enucleated the submaxillary gland, and the one or two small ones which came in view. The flap was brought down, and the edges secured with carbolized silk sutures, the lip being secured with silver wire, and a drainage tube inserted in the lower angles.

The patient had a good night, and for the next two or three days everything seemed to be going on well; the mouth was kept washed out with carbolized water, and the patient ordered beef tea. It was found very difficult to keep the mouth clean, and the patient expressing a desire for some eggs and milk, it was given to him; this collected so in the inside of flap under the tongue that it was found almost impossible to keep the wound clean; the flaps at the edges commenced sloughing, and the stitches gave way. I cut off the sloughy parts, cleaned the mouth out, and put in fresh silver wire sutures, and ordered him to have no food by the mouth at all, but to be fed with peptonized beef tea and port wine enemata; he, however, gradually lost ground, and died fourteen days after the operation.

Post Mortem.—The organs were generally healthy. The lungs were slightly pneumonic at bases, and contained a quantity of mucopurulent frothy fluid. The back of the tongue, pharynx, and tonsil were nearly healed. The wound generally looked sloughy.

CASE VI.—*Epithelioma of Gums, extending to Jaw, necessitating the excision of the whole of Lower Jaw. Recovery. Recurrence and Death nine months later.* Under the care of the Author.

N. M., ætat 43. Epithelioma of gums and jaw, secondary to epithelioma of lip, was admitted to the Cancer Hospital on the 3rd May, 1885.

Previous History.—Twenty years ago had a small warty growth on right side of lower lip, which was removed. There was no recurrence for thirteen years, when another growth sprang up in the cicatrix; the patient took but little notice of this, and had nothing done to it for four years, when it had grown somewhat, and being troublesome he went to Ipswich Hospital, where a semicircular piece of the lip was removed and the wound healed. The growth, however, returned in nine months, when he was advised to consult Dr. Fell, who applied caustics to it several times with but little result. The patient then thought he could burn it out for himself, and he applied a paste made of the chloride of antimony, with the effect of eating away a considerable piece of the lip and affecting the gum.

Family History.—Sister said to have died of cancer. No other relatives affected. No history of syphilis or phthisis.

Present State.—There is a gap in the lower lip a quarter of an inch wide and half an inch deep, situated opposite the right canine tooth, the gums are thickened and hard, and there is a nodule on the inside of the cheek.

The parts were freely removed and brought together with hare-lip pins, and the wound healed quickly and well.

Three months afterwards he returned, having noticed a swelling of his lower jaw on the right side, and suffering most violent neuralgic pains.

Present State.—There is a swelling just beneath and slightly in front of the right inferior maxilla, about an inch from the symphysis and slightly posterior to the old cicatrix.

It has to the naked eye the appearance of an abscess about to burst, but to the touch it is firm though elastic. The swelling is about the size of a walnut. The teeth above it and to either side are loose and apparently pushed up from their sockets ; there is a slight purulent and very offensive discharge into the mouth. There is a spontaneous fracture through the jaw at a point between the bicuspid and molar teeth, the posterior portion of bone being quite loose. There is no ulceration of the gums and no enlarged glands.

As the disease was extending and causing much pain, I determined to remove the right half of the jaw, which was done without difficulty. On dividing the symphysis of the jaw with the bone forceps, it was found to be quite soft and spongy, and the disease was then discovered to extend considerably over the left side of the bone. It was then decided, upon consultation with my colleagues, to remove the remaining half of the jaw, which was done.

The man was fed entirely with the œsophageal tube for some time, and he made a good recovery. Microscopical examination of the growth proved it to be epithelioma.

Operation, May 17.—The lip was divided down the centre and the vessels at once secured; an incision was then continued from the end of the first along the under surface of the jaw to the angle, the flap then formed was dissected from the diseased structures. The jaw was divided rather to the left of the symphysis with bone forceps, and the right half of the jaw was removed. There was pretty free hæmorrhage from the facial and other vessels which were divided. This was easily and quickly controlled by the clamp forceps and the vessels ligatured. The disease having been found to extend considerably into the remaining half of the jaw, it was deemed advisable to remove this also. I endeavoured to do so without making another incision along the edge of the jaw, but on applying the lion forceps to depress the jaw, it broke close to the angle, evidently being weakened by disease; it was then found necessary to make an incision in continuation with the one on the opposite side as far as the anterior border of the masseter muscle, taking care not to divide the facial artery ; the ramus of the jaw are then seized with lion forceps and depressed, the attachment of the temporal muscle divided, and the condyle disarticulated. Some troublesome hæmorrhage occurred, caused apparently by the tearing through of an arterial twig close to the internal maxillary artery ; this was secured, the lip was brought together with hare-lip pins, and the flaps by silver wire sutures, a free drainage being allowed at the lower angle on either side. The mucous membrane of the floor of the mouth was carefully stitched to that on the cheek, and the frænum of the tongue fastened with silver wire suture to the mucous membrane of lips. The tongue was secured by a silk ligature passed through its tip and fastened by means of a strip of sticking-plaster to the forehead, the whole wounded surface being freely dusted over with iodoform powder; the patient was then taken to bed.

May 18.—Passed rather restless night. Temperature, 99·4°; pulse, 136; respiration, 16. Sat up in bed for his wound to be dressed, and expressed himself as being better and freer from pain than he had been for a length of time. The mouth was thoroughly syringed out with weak carbolic lotion. The drainage tubes were carefully cleared, and the wound dressed with dry sero-sublimate gauze. He was fed entirely by means of the gum-elastic catheter and funnel passed over the back of his tongue, with strong beef tea, eggs, and milk, and had six ounces of brandy in the twenty-four hours.

May 19.—Wound dressed and mouth syringed out. A point on the lip and chin, on the right flap, close to where the original operation was performed, this morning has a gangrenous appearance. Temperature, 102·5°: ordered two grains of quinine three times a-day, the brandy was discontinued, and port wine substituted.

May 20.—Wound looking healthy, with the exception of the lower angle of the anterior border of the right flaps, which will evidently slough. He has a flush over the right side of nose and cheek. The right eye also looks bloodshot and inflamed. Temperature lower: sits up in bed very much stronger. Bowels opened regularly since the operation.

The ligature was removed from the tongue to-day.

May 22.—In the medium line extending from the chin upwards to the extent of about an inch, and half-an-inch in thickness, is a blackened patch of skin which has sloughed. The wound is suppurating very freely, the whole of its edges being bathed with pus. Temperature, 98·8°; pulse, 84; respiration, 22.

May 24.—Slough at point of chin cut away, the edges of wound pared and brought together with silk sutures.

Wound was dressed with carbolic oil dressing and Gamgee's pads, being previously well dusted over with iodoform powder.

May 24.—Another piece of slough removed in connection with the old cicatrix.

The patient from this point continued to improve; he was fed entirely by means of the gum-elastic catheter until the 3rd June, when he was allowed up for a short time.

On the 10th June he took a little fluid from a feeding-cup, being able to swallow fairly well; and on the 23rd July, nine weeks after the operation, he was discharged, being then quite able to feed himself, and the wound healed.

On section of the bone it was seen to be of a dull, whitish colour, of somewhat spongy consistence, easily cut into with a knife in parts, but harder towards the margin. Microscopically large masses of squamous epithelial cells were seen here and there, forming the typical bird-nest groups; these cells were intermixed with spindle cells in a firm fibrous stroma.

The man has presented himself from time to time at the out-patients' room, and has continued to improve in health, there being no sign at present of any return of the disease.

This patient's death was reported to me as occurring in February 1886, just nine months after his jaw was removed.

CASE VII.—*Spindle-celled Sarcoma of Antrum. Removal of the growth with the Floor of the Orbit. Recovery.* Under the care of the Author.

John M., ætat 14. Admitted into Cancer Hospital on the 6th August, 1885. Occupation: assisted his father, a sailor.

Family History.—No history of cancer, tumour, or phthisis.

Previous History.—Patient first noticed, eighteen months ago, a lump on the right side of his nose; this increased rapidly in size, and filled up the right nostril. Six months ago a small reddened and inflamed spot appeared just below the inner angle of the eye. On the appearance of this pimple he applied to the Infirmary at Hull, where it was cut into; at the same time an attempt was made to remove the growth from the nostril. There had been very little discharge from the nostril, but what there was, had been of a sanious character. Patient says when a boy, about 7 years of age, his nose used to bleed a great deal, on an average once every two or three weeks.

Present State.—The right side of nose is dilated and flattened; and protruding from the nostril is a firm, but highly vascular, growth of a dark purple colour. The septum of the nose is pushed completely over to the left side, so much so, that the patient cannot breathe in the least through the left nostril, neither could I pass the finest catheter through it. He can by forcible expiration expel a little air through the right nostril. There is a small inflamed spot situated just below the inner canthus of right eye. The eye is somewhat protruded and pushed slightly outwards.

There is a fulness in left half of palate, but none on right side, neither is there any bulging of anterior wall of the antrum under the eye.

On the 11th August a small piece of the polypoid growth was removed by means of the galvanic écraseur; free hæmorrhage took place, the blood spirting out from a small artery; it was found difficult to arrest it, but ultimately, by means of a piece of iron lint and a bandage applied round the nose over the head, it was arrested. Microscopical examination of this section proved it to be a spindle-celled sarcoma, with a large amount of fibrous stroma.

On the 18th August, the patient being placed under the influence of ether, I proceeded to operate. I was particularly anxious, if possible, to preserve the alveolar process and hard palate, as well as the orbital plate of the superior maxilla; with this view I made an incision from about half-an-inch below the inner canthus of the right eye, down the side of the nose, around the ala to the middle line, then divided the upper lip and secured the coronary arteries, which I tied at once; dissecting this flap up from the bone and turning it outwards, I turned up the right nostril and tried to find how far the polypoid growth extended. I then with a small saw cut into the antrum, just above the alveolar, and with a chisel divided the bone into the antrum above. I found the antrum filled with the tumour, which had absorbed the internal plate of the antrum, and pushing into the orbit through the lachrymal canal. The tumour was found to be growing from the middle turbinate bone and inner plate of the antrum, and extended upwards under the nasal bones, pressing upon the frontal sinuses, and backwards in the orbit to sphenoid bone. It was therefore found to be impossible to remove the whole of the growth without taking away the orbital plate; this was easily divided with bone forceps, and removed. There was very extensive hæmorrhage throughout the operation, the tumour being excessively vascular, and had I not taken the precaution to plug the posterior nares with a sponge, I should have experienced a great amount of trouble, and the patient would have run a great risk of being choked. With my finger and a gouge I was enabled now to remove the whole of the growth, and by freely applying Paquelin's cautery the bleeding was controlled. The seat of the growth was treated with a piece of lint smeared over with chloride of zinc paste, this being packed well around to prevent the healthy surface being attacked by the caustic; one or two small bleeding points in the antrum were treated with small pieces of iron lint, and the whole dusted with iodoform. The edges of the wound were then brought accurately together with horsehair sutures, the wound being painted over with collodion and wool. The upper lip was united by hare-lip pins.

August 20.—Some of the plugs of lint were removed. Lad very feverish, temperature 103·2°, pulse 132. There is a good deal of œdema around the eye.

August 21.—The inflammation is less than yesterday. Temperature: morning, 102·4°; evening, 100·5°; pulse, 120°. Another piece of lint was removed from nostril; the patient continued to improve, the nostril being syringed out with a solution of Condy's fluid; there is a good deal of offensive discharge, which continued until the 17th September, when, on syringing the nostril out, a large piece of lint was seen to be still in the nostril; this was removed, and a quantity of purulent discharge escaped. From this date the discharge decreased, the puffiness of the eye subsided, and on the 28th September he was discharged, the wound being quite healed, to attend as an out-patient.

CASE VIII.—*Mr. Hayward's Case of Epithelioma of the Tongue and Floor of the Mouth, implicating the Symphisis Menti. Removal of the Symphysis and Tongue. Recovery.*

T. B. R., ætat 51, gardener, was admitted into the Cancer Hospital, under the care of my colleague Mr. Hayward, on the 18th June, with an epitheliomatous ulcer in the floor of his mouth underneath the tongue. He had no history of cancer, tumour, phthisis, or syphilis in his family.

Previous History.—Has always enjoyed good health. About twelve months ago noticed a small pimple at the base of the mouth, which soon commenced to ulcerate. He attended as an out-patient in April last, and had been seen from time to time since then until his being admitted into the hospital.

Present State.—Patient is a fairly healthy-looking man, but has lost a good deal of flesh lately. On admission there was found to be a well-defined ulcerated patch extending along the base of the tongue from a line with the second bicuspid tooth on the left side to a point opposite the second molar on the right side. It extends upwards to about half-an-inch from the surface of the tongue. In front it is invading the base of the mouth, the edges are hard and well defined, and just to the left of the median line the surface of the ulcer is slightly excavated. It is very painful to the touch, and the patient complains of pain shooting up to the ear. The ulcer extends forward on to the gums, apparently implicating the jaw. On consultation, it was decided to remove the disease by operation, and with it a piece of the lower jaw corresponding to the symphysis, and as far back as the bicuspid tooth on the left side and the first molar on the right side.

On the 27th June, he being placed under the influence of ether, Mr. Stonham proceeded in the first instance to perform tracheotomy, after which a sponge attached to a strong piece of silk was pushed into his pharynx, thus preventing any blood getting into his trachea or being swallowed. An incision was then made vertically through the lower lip in the middle line to about an inch below the chin; the soft parts were then dissected from the bone, and the bone itself sawn through on either side of the symphysis at the points already named. This piece of bone, together with the whole tongue and floor of the mouth, were removed as far back as the circumvallate papillæ.

The lingual arteries bled freely, but were quickly caught up with the clamp forceps and tied; a few other vessels were also ligatured, and the whole parts thoroughly dusted with iodoform, the lip being brought together by hare-lip pins.

The edges of the bone were not secured in any way.

June 27.—In the evening the tracheotomy tube was removed, as it caused him much distress. On the 28th he had passed a fairly good night, but was troubled with a good deal of mucus in his trachea. Temperature 99·8°. He was fed with the œsophageal tube, and continued to do well. On the 30th the temperature rose to 101·2°. On the 2nd July two pins were removed; on the 4th the last pin was taken out, the wound looking well.

The stump of tongue is granulating, there is no fœtor of breath. Patient has a good deal of mucous and bronchial irritation, causing constant cough. The tracheotomy wound is pale and flabby, ordered to be dressed with lob. rub. Iodoform constantly dusted in mouth over wounded surface. He still takes his food by the tube. Says he has a good appetite, and looks very well. He continues to improve rapidly, and on the 6th August he was discharged well.

The patient was readmitted on the 28th September with a small gland under the right angle of the lower jaw, which was removed on the 3rd October. The two ends of the jaw are now fixed with a strong fibrous tissue, which keeps them firmly attached.

Case IX.—*Epithelioma of Tongue, implicating Pillars of the Fauces and Pharynx. Enlarged Glands at angle of Jaw. Half Tongue removed by Kocker's Operation. Glands in the Neck removed, necessitating the ligaturing of the Common Carotid Artery and Internal Jugular Vein.* Under care of Author.

Robert S., ætat 50, was admitted into the Cancer Hospital on the 24th February, 1885, suffering from a large ulcer at the extreme back of the right side of the tongue, implicating the pillars of the fauces, tonsil, and side of pharynx on the same side.

Family History.—No history of cancer or phthisis.

Previous History.—Had his right eye extracted three and a-half years ago from the result of an accident. There is no history of syphilis. Has been a hard drinker, often taking neat spirits, and a great smoker. He first noticed a stiffness and soreness at the back of his tongue some six weeks previous to admission; this gradually increased, the act of swallowing was very painful to him, and he suffered from violent neuralgic pains shooting up to his right ear and over the back of head.

Present State.—At the extreme back of the tongue, extending from just in front of the foramen cæcum posteriorly to about a quarter of an inch below the line of the epiglottis on the right side, and involving the whole of the posterior part of the right half of the tongue, is an extremely hard swelling, which extends deeply into the floor of the mouth, involving the pillars of the fauces and tonsil. The floor of the mouth on the same side is hard and indurated as far forward as the sublingual gland. The submaxillary glands are enlarged.

After a consultation with my colleagues it was determined to put him on a course of large doses of iodide of potassium for a fortnight, there being some doubt as to the character of the disease. At the end of this time, as he did not improve, and the growth at the back of the tongue was growing rather rapidly, and threatening to ulcerate through the mucous membrane, it was decided, at the express wish of the patient, to attempt its removal.

On the 17th March the patient was placed under the influence of ether, and I made an incision extending from a point behind the angle of the jaw, on a level with the lobe of the ear, to within two inches of the clavicle, along the anterior border of the sterno-mastoid muscle, the object being by one incision to combine a Kocker's operation for the removal of the tongue, and also to enable me to ligature the common carotid artery, this being deemed advisable owing to the close relation of the growth with the external carotid artery.

On dividing the platysma the superior thyroid and facial veins were found to be much distended and very large; it being necessary to divide the former, I, before doing so, placed a ligature on either side of the point I intended to divide; in tying the proximal end it was found to be so close to the internal jugular vein that the ligature was somewhat insecure; I thought it desirable, therefore, to ligature the larger vessel, and so avoid any risk of hæmorrhage. The internal jugular was tied in two places, and divided between the ligatures. I then tied the common carotid in two places, dividing it also between the ligatures.

After all bleeding was arrested I made a semilunar incision from the symphysis of the lower jaw, meeting the first incision at about its centre; the flap of skin and platysma was then dissected up, and the mylo-hyoid and other muscles divided, and I speedily obtained an opening into the floor of the mouth. I next prised the mouth open with a Mason's gag, and passed two ligatures through both sides of the tongue, and split the organ down the centre as far back as the epiglottis, and drawing the diseased half through the opening snipped it, and the whole of the tissues in the floor of the mouth, the tonsil, pillars of the fauces, and the diseased part of the pharynx away with scissors, lastly, separating the root of the tongue from the epiglottis and hyoid bone, removing afterwards all the tissues that appeared to be at all infiltrated with the disease. A drainage tube was then placed in the wound, the edges of which were brought together with horsehair and wire sutures. The whole of the wounded parts were thoroughly dusted with iodoform, and the wound dressed with sero-sublimate gauze, and the patient returned to bed.

March 18.—On removing the dressing a good deal of serous discharge escaped. Wound looking healthy. Pulse 108. Temperature 102°. Fed with three-quarters of a pint of extra strong beef tea, brandy ℥ ss, and milk and eggs, by means of the gum-elastic catheter and funnel.

March 19.—The temperature has risen to 103°. Ordered quinine, gr. ij, every three hours. Pulse good. Patient expressed himself as feeling better, and free from all neuralgic pains. Sleeps indifferently. Ordered a quarter of a grain of morphia at bedtime.

March 22.—Temperature still keeps very high. Patient has an anxious expression, pulse hard and bounding, wound red and inflamed round the edges. Ordered six grains of quinine with his beef tea every four hours, and hot boracic acid fomentations. The morphia to be continued at night.

March 23.—Patient improved. Temperature lower; not nearly such anxiety in his countenance. Still some redness about the edges of wound. Continue the quinine and boracic lotion.

March 24.—Temperature fallen to 100°. Quinine to be reduced to four grains three times a-day. All sutures removed but one. Patient expresses himself as much better.

March 25.—Temperature, 98°. Passed a restless night after the quinine. To be fed by enemata as well as by œsophageal tube.

March 26.—Is improving; there is a good deal of discharge from the wound of a healthy character; the wound is looking healthy. Quinine reduced three grains, three times a-day.

Patient continued to improve, and on the 30th March he was fed with the feeding-cup with tube attached; some of the fluid passes out through the wound if the tube of cup is not passed over the tongue beyond the opening. Temperature, normal.

April 16.—Was seized with an attack of giddiness this morning. Temperature, 102·6 . Complained of no pain, and expressed himself better. In the afternoon he was in perspiration. Pulse, 128; temperature, 104°. Complains of thirst; no cerebral symptoms excepting the giddiness. He seems, however, at the time to have lost the power of his legs, and had to be lifted into bed. No headache or nausea. Wound looks healthy; pupil somewhat dilated, but answers well to light. Quinine, gr. ij, four hours. 7 P.M.: temperature still rising; condition of patient the same as described above, without vertigo. Says he feels all right. Lungs and abdomen healthy. Quinine, gr. iv, every four hours; to have a turpentine enema and five grains of calomel, followed by a black draught in two hours.

April 17.—Patient seems much better. Temperature still, however, 103·4°; skin feels cool, but damp. Bowels have been freely opened. 4 o'clock: pulse, 100; twitching of facial muscles of left side; wound healthy.

April 18.—Temperature normal; quinine to be omitted.

He continued much in this state until the end of May; sometimes his temperature very high, with slight vertigo and intense perspiration. After this date he gradually improved; the wound healed, with the exception of a fistulous opening at the lower end, which evidently communicated with the mouth. On the 20th July he was well enough to be discharged. His jaw is gradually contracting, and now he can only open it to the extent of about half-an-inch. He was readmitted in August, with apparently a return of the disease at the back of the mouth, the remaining half of the tongue is quite healthy, and ultimately died, nine months after the operation.

CASE X.—*Mr. W. Whitehead's Case of Excision of the Cæcum for Epithelioma. Death on the thirteenth day.*

J. W., aged 38 years, tramcar driver.

Previous History.—Has always enjoyed good health. For ten years has been a free drinker, generally taking spirits.

His present disease manifested itself eighteen weeks before admission, with diarrhœa, accompanied by pain in the right lumbar region. The pain was paroxysmal and extended towards the umbilicus, and appeared to be aggravated by distention of the bladder or loaded rectum. At the end of ten weeks a small tumour could be felt, the size of a walnut, in the right lumbar region. It felt hard, was freely movable, and free from pain on pressure. The tumour rapidly increased in size, and the paroxysms of pain in frequency and intensity. In eighteen weeks he lost 40 lbs. in weight.

He was admitted into the Manchester Infirmary on the 24th October, 1884. The clinical undoubtedly pointed to a tumour of the colon in the vicinity of the cæcum, and most probably a rapidly-growing epithelial new formation. The tumour being movable, it appeared reasonable and justifiable to attempt the excision of the whole disease.

Operation.—Chloroform was administered. The surface of the abdomen was thoroughly cleansed and dried. The abdomen was opened by an incision along the outer border of the rectus muscle over the tumour, which was thus exposed, and on examination was found to be situated in the ascending colon, rather than the cæcum, although practically it involved the latter. It was deemed advisable to detach the tumour above the valve. A double catgut ligature was first passed through the mesentery and round the upper part of the ascending colon, well above the tumour; the ligatures were firmly tied and the bowel divided between them. The cut surfaces of the bowel were freely washed with carbolic lotion, until they were free from any fæces. A second double ligature was then passed round the ileum in the same manner, and the gut divided with similar precautions.

A small aperture was then made in the upper layer of the mesentery, through which the finger was passed, and the two layers of mesentery separated. The superior layer was cautiously divided close to the bowel by the use of scissors. An indurated mesenteric gland, the size of a split walnut, was then discovered some distance from the growth, whilst others somewhat smaller were found inseparable from the gut. Up to this stage of the operation no difficulties whatever had been met with. The removal of the gland being deemed essential to the ultimate success of the operation, a careful dissection was commenced. The gland had almost been cleared from its surroundings, when a sudden gush of dark blood took place, the origin of which it was impossible to determine at the moment; that it was from an unusually large vein there could be no doubt, and for a time the vena cava was suspected. Whilst pressure was maintained over the bleeding aperture, the tissues above and below were separated, and finally the superior mesenteric vein was fully exposed and found distended to the size of the first finger. A catgut ligature was placed round the vein above and below the gland, and the intermediate part of the vein and the gland removed together. The other layer of mesentery was then cut across without any bleeding, and the mass removed. The abdominal cavity was cleared of all the blood, which had amounted to very little throughout the operation, notwithstanding the accident to the vein. The ligature was then removed from the small bowel, and the gut stitched to the skin at the lower end of the incision, and after removing the other ligature the colon was secured to the skin at the upper portion of the wound. A very large number of silver wire sutures were employed for this purpose, and great pains were taken to leave no opening for the penetration of fæcal matter into deeper tissues. The remaining portion of the wound was next brought together by strong silver wire passed through the skin, muscle, and peritoneum. The surface was dressed with iodoform. The patient did fairly well for the first week or ten days after the operation, but died on the thirteenth day from extensive peritonitis.

CASE XI.—*Mr. A. Barker's Case of Gastro-enterostomy for Cancer of the Pylorus and Stomach. Good Recovery.*

Mrs. L, aged 37, the mother of eight children, one of whom died of a malignant growth in the neck in infancy, began to suffer from severe gastric disturbance a year and a-half ago. This consisted of great sickness and vomiting, with pain in her stomach. Since then hardly a day passed without retching; this was always worse after dinner, but was less in the evening, and when the patient was at rest.

On the 25th August, 1885, the patient noticed a lump, about the size of a walnut, in the epigastric region, and, at the same time, the vomiting and pain became much worse; the latter was aching and dragging in character. The tumour had grown larger since, especially within the last three months. When first noticed, the lump, the patient thought, was a little more to the left than now; it appeared irregularly nodulated from the first.

On admission into University College Hospital on the 19th December, 1885, the chief complaint was pain in her left side, and great weakness and loss of flesh (weight 7 stone 3 lbs.). During the week preceding, her attacks of sickness had not been so severe; she had had only four or five. The vomit was watery and frothy, but never consisted of food, and never showed traces of blood; there had been much constipation for a long time.

State on Admission.—In the middle line of the body, about two inches above the umbilicus, was a hard nodular swelling, about the size of an egg, very superficial, and very mobile. It shifted spontaneously from side to side during the day, and ascended a little, but did not descend below the point indicated. When in the middle line, it pulsated with the stroke of the aorta. It was tender on pressure, and caused most suffering when it lay towards the left side. There was no deficiency of resonance to be detected over it, and there was no gastric dilatation; the tumour moved with respiration; the abdominal organs appeared quite healthy.

On the 28th December I made a careful examination of the abdomen under ether. The tumour could now be easily grasped through the thin parietes, and was found to be rugged in outline, about half the size of an orange. It showed the most remarkable mobility in all directions except downwards. It could be easily pushed under the last rib on the right side, and be there felt with the hand. It could be pushed almost into the same position on the left side, but with greater difficulty. It could not be made to descend. Nothing else abnormal was discoverable in the abdomen. After this examination the patient was sick several times, but brought up no blood. The urine remained normal. From this examination I strongly suspected cancer about the pylorus, though it was clear that there was much room for a difference of opinion as to the nature of the tumour, and I thought it might possibly turn out to be a floating kidney. One of my colleagues suspected a collection of biliary calculi in the gall-bladder. As the patient was very anxious for operation, I explained the matter fully, and agreed to make an exploratory incision, and be guided by what was found. Every preparation was made for dealing with whatever kind of tumour should be found, and especially for excision of the pylorus, should it be necessary. The stomach was washed out twice on the day before operation, and again two hours before the latter, with warm water, introduced through a long flexible tube; and no food was given afterwards. With the most scrupulous care as to antisepsis, I operated on the 5th January, 1886, under the spray. An incision was made in the middle line, from just below the ensiform cartilage to the left side of the umbilicus. When the peritoneum was opened, the tumour presented at once to view. It was then easily diagnosed to be a mass of new growth, reaching from the anterior border of the pylorus about three inches to the left, and upwards towards the lesser curvature of the stomach. It was about the size of half an orange, flat externally underneath the serous covering of the stomach, and projecting into the narrow end of the latter. The posterior segment of the pylorus appeared sound to the touch. The tumour was perfectly non-adherent, but there were a few small hardened glands in the gastro-colic omentum. From the position of the growth and the presence of infiltrated glands, I concluded that excision of the pylorus was contra-indicated, and at once commenced the palliative operation of gastro-enterostomy, or the establishment of an artificial opening between the stomach and jejunum. After pushing the omentum, which was not voluminous, to the left, the first part of the jejunum was caught in the fingers, and a loop of it was drawn out of the incision. The middle of the anterior surface of the stomach was also drawn out, and was supported all round by warm carbolized sponges. I now passed a piece of the india-rubber tubing through the mesentery at each end of the loop of intestine; and, having emptied the portion of gut between by gentle pressure, drew the ends of the tubing tight enough to prevent access of the contents of the bowel into the loop to be operated on, and fixed each piece of tubing with a catch forceps. The empty loop of gut was now laid upon the portion of the stomach to be opened; and a longitudinal fold of the latter, about an inch and a-half from the great curvature, was pinched up between the finger and thumb of the left hand, together with the collapsed gut. I now made an incision about an inch and a-half long in the fold of the stomach, and another corresponding in the approximated fold of gut. These incisions only penetrated through the serous and muscular tunics, and left the mucous coat of both viscera intact for the present. Still holding the parts, as before, between finger and thumb, I now united the corresponding posterior edges of the wounds by a continuous suture, the needle entering and emerging in each case between mucous and muscular coats, and the threads crossing the cut edges of the muscular and serous coats. In this way the serous surfaces were closely united from end to end before either viscus was opened. This row of stitches (which were about an eighth of an inch apart) was carried about a quarter of an inch beyond each end of the incision in the coats of the bowel. The moment had now come to open both the stomach and intestine completely; and this was done with a stroke of a scissors through the mucous coat in each case, special sponges being ready to receive any fluid which might escape. A few drachms of *succus entericus* flowed from the bowel, little or nothing from the stomach-opening. After careful cleansing, the anterior borders of both openings were now united by a row of interrupted fine silk sutures, introduced according to Czerny's method. When this was completed, the two openings were securely closed, but, as an extra precaution, the intestine was turned over, and the posterior suture was reinforced by a second row of interrupted sutures, placed about a quarter of an inch away from the first. The anterior row was then similarly reinforced by a row of continuous suture, taking up, as before, only the serous and muscular tunics. The elastic compressors were now removed from the gut. Lest there should be any "kinking" of the latter, as in one of Billroth's cases, I stitched its efferent portion to the stomach-wall, about three-quarters of an inch from the right extremity of the opening between the stomach and jejunum now established. The "toilet" of the peritoneum, replacement of the viscera, and closure of the external wound, completed the operation, which had lasted an hour and thirty-six minutes. The wound was dressed with salicylic wool. This mode of suturing the posterior edges of the opening before the stomach is actually opened appears to be a new departure, and offers many advantages, which are obvious.

The patient bore the operation, on the whole, well, though towards the end the pulse became a little feeble. She was warm and comfortable when removed from the table. Peptonized enemata were ordered every six hours, and only ice by the mouth.

The rectal temperature was usually below 100°. It is marked as 102° on the fourth day, but this is believed to be an error. Two hours later it was 99·2°. On this day she was rather depressed, probably on account of menstruation having set in. The amount of brandy and beef tea was doubled. On the fifth day she was given beef tea by the mouth in ounce doses every hour, and on the sixth day an ounce of champagne every second hour and a tablespoonful of arrowroot. On the 11th day she took some minced chicken, all of which was well digested. On the sixth day there were two natural stools, accompanied by a good deal of pain. On the thirteenth day I ordered half a drachm of confection of senna; and on the fourteenth day she complained of a good deal of pain about the descending colon, which was relieved by a high-reaching enema, which brought away a large quantity of fæces. She seemed so well on the seventeenth day after operation that she was allowed to sit up in a chair for half-an-hour, and enjoyed it greatly.

The stitches in the abdominal wall were all removed on the ninth day, and the wound was found to have united by first intention everywhere. It was still supported by broad strips of American rubber plaster in case or straining of any kind.

It is now more than a month since the operation, and still the patient continues well. She has suffered a little from constipation on one occasion, but has been relieved by enemata, and, to prevent this trouble recurring, is now taking small doses of laxatives. She sits up every day for some hours, after being confined to bed for more than five months. Her pulse is 78, her temperature normal, her bowels acting well, and altogether she is much improved and cheerful.

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